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HUDSON RESOURCES INC.
WHITE MOUNTAIN ANORTHOSITE PROJECT
GREENLAND
PROPERTY LICENSE 2002-06

Greenland Social Impact Assessment

Submitted to:

REPORT

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inuplan

Golder Associates

Executive Summary

ENGLISH

Hudson is proposing to build and operate an anorthosite (calcium feldspar) mine at the White Mountain Project ("Project") located 80 kilometers southwest of Kangerlussuaq and 80 kilometers southeast of Sisimiut. The project is comprised of a small (300 m x 400 m) open pit, 10 km haul road, processing plant and storage building, tailings facility and a port on the Sondre Stromfjiord. The Project will mine and process 285,000 tonnes per year (tpy) of anorthosite rock and ship 200,000 tpy annually to Europe and North America for use in manufacturing E-Glass fiberglass. Approximately 85,000 tonnes of waste material will be produced each year and this will be safely disposed of in a small lake located six kilometres from the processing plant. The waste material does not contain any chemicals are toxic elements.

During operations, the Project will employ around 61 full time people annually. Twenty people will be required during the construction phase. The project is expected to operate for at least 20 years. Hudson's personnel targets are for a minimum of 80% Greenlandic employment during the operating life of the mine and 50% for the construction phase.

The Project is forecast to generate between DKK 175.1 – 209.7 million in direct and indirect tax revenue over the initial 20 year life of the project. The largest contribution is anticipated to be from direct income taxes from Project employees and the indirect economy wide tax impact through the multiplier effect from this employment. The inclusion of a 2.5% royalty implemented by the Government of Greenland means that tax will be collected from Hudson every year the project operates, regardless of its profitability.

During the operations phase, approximately DKK 31.4 million will be spent annually in Greenland, approximately DKK 12.5 million of this will be for direct labour costs. The remaining DKK 18.9 million will be used to purchase goods and services in Greenland.

The mine and ancillary facilities in Greenland are estimated to cost DKK 96 million to construct.

The purpose of this report is to assess the effects of the Project on existing social conditions of towns and settlements in the local study area (LSA). The steps for this assessment include the identification of key questions concerning all social aspects of the Project. These include issues regarding the Project's timing, location, its relationship with local communities, the environment, workforce and the economy. These "assessment indicators" are then evaluated and solutions are proposed to reduce or eliminate any adverse effects or to enhance the benefits of the project.

One of the objectives of the SIA is to assist in the development of a benefit and impact plan which will be used as a basis for negotiation of an Impact Benefit Agreement (IBA) with

impacted communities and stakeholders. The IBA will define the cooperation between Hudson, national authorities and local authorities in relation to maximizing development opportunities and mitigating impacts from the project. Hudson will work with the Ministry of Industry and Mineral Resources (MIMR) and the municipality of Qeqqata in preparation of the IBA.

Examples of Assessment Indicators Evaluated in this Report

Workforce

The White Mountain Project is proposing to operate on a rotational workforce. A final decision on a rotation schedule will be determined following further consultation with the labour union, communities and the Greenland Working Environment Authority. Although Greenlanders no longer rely solely on hunting and fishing for food, these traditions remain an integral part of the culture. As a result, these work rotations may have potential effects on the well-being, cohesion, physical and mental health of employees, their families and communities.

Steady incomes associated with the Project are expected to enable people to lead healthier lifestyles, including money to purchase higher quality goods and services. Rotational work schedules have also been noted to give traditional food harvesters a longer period of time to go out on the land compared to a “nine to five” job with weekends off.

On the other hand, greater wealth has the potential to have an adverse effect on physical and mental health due to the possibility of increased substance abuse and negative social pathologies by Project employees. This may include greater consumption of alcohol, marijuana (and other illegal substances), cigarettes and an increase in the rate of gambling. The Project will mitigate this effect by implementing a zero tolerance policy for drugs and alcohol in the workplace, camp accommodations and during transport to and from rotations in all phases of the Project. An employee and family assistance program will also be made available to any employees and their families who may be suffering from substance abuse and related mental health issues.

Health and Safety

There is the risk to LSA residents and employees from occupational health and accidents. Hudson will mitigate these effects by developing a health, safety and environment policy. This will include health and safety training for all employees in Greenlandic, Danish and English. Project operations with focus on safety first and inspection and maintenance of equipment will be a key part of this. Work places (the mining pit, roads, buildings and equipment) will be off limits to everyone except those that have been trained to operate in that space or with that equipment. On-site health services will be established, including the employment of an on-site heath practitioner.

Effects on the Environment

As in any mining project there will be concerns raised about how the Projects development may lead to the disruption (or contamination) of traditional harvested foods including animals, fish, and plants used for food and cultural activities. In order to mitigate these concerns, Hudson will educate LSA residents on how this mining operation will function. The mine will operate as a quarry, a process that is likely already known to most Greenlanders from the Seqi Olivine mine. The Project does not use any chemicals or water in the processing of material, and is primarily a crushing operation. None of the anorthosite contains any toxic or heavy metals. The Project will not impact the Itilleq Fjord to the west of White Mountain, which is recognized as having significant environmental sensitivities.

Hudson will maintain clear and open communication with the communities about potential effects on the environment and will disclose all results of their environmental monitoring activities. A grievance mechanism will be established to respond to potential concerns related to Project activities. A complete assessment of the environmental risks is outlined in the Environmental Impact Assessment (EIA).

Cultural Issues

An archaeological survey was conducted at the White Mountain (*Qaqortorsuup Kangilia*) site by the Greenland National Museum and Archives (GNMA) in June of 2013 to assess the Project area for culturally significant features. Only one of the archaeological features discovered a shooting blind at site 66V1-00I-096, conflicts with the proposed Project footprint at the pit area. GNMA suggested that it is preferable that the blind is not disturbed, but if redesigning the pit is not possible, destruction of the blind can be considered, as it is not a unique structure. Hudson will take every precaution to protect the blind, and if possible, will move it out of harms way. Any action on the blind will be discussed with the GNMA prior to any changes to the site. A chance finds procedure will also be established for construction and operations activities to mitigate any effects to archaeological sites discovered during Project activities.

Hunting and Fishing

Greenland has a strong tradition of hunting, fishing and natural resource use, which is firmly embedded within the cultural and economic fabric of the country. Land, water and resource use is equally important within the LSA, where residents hunt and fish for recreational, commercial and subsistence purposes. The Project has the potential to affect land, water and resource use directly by changing access to recreational/natural areas. In addition, dust, noise and increased access to the Project area may affect hunting, fishing and harvesting activities for both recreational and livelihood purposes. In order to mitigate potential increased access to the area, the Project access road will be private, and public access will be prohibited.

It is important to note that the Project will not have any impact on the Itilleq fjord, which is recognized as having significant historical and current social importance to local communities for fishing, hunting and recreational purposes and is of significant archaeological importance.

One potential consequence of new jobs in the area is that commercial hunters and fishers may abandon their activities to pursue Project employment, resulting in decreased opportunities to transfer traditional knowledge and practices to other community members. Hudson will support municipal programming aimed at promoting these important socio-cultural activities within the LSA in order to mitigate this potential effect. Traditional foods will also be made available to employees on-site resulting in an increased opportunity to sell hunted and fished goods. Hudson will work with the Greenlandic Veterinary and Food Administration to determine the regulations for buying food from local hunters and fishers. The requirements for supplying food to the project will be made available on the company's web site before production commences.

Water quality downstream from the Project site will be monitored on a regular basis as part of the environmental monitoring program. The Project could result in a permanent change to nature and landscapes in the Project area. In order to mitigate this effect a mine closure and reclamation plan will be developed and implemented.

Conclusion

After mitigation measures are implemented, the SIA determined that there are no residual negative effects from the Project on the social environment. The Project will result in several long term benefits including:

- direct, indirect and induced employment;
- purchase of food, fuel and services from local businesses;
- revenues from corporate and personal taxes;
- diversification of the local and national economy; and
- workforce skills development for Project employees.

Pingaarnernik Eqikkaaneq

GREENLANDIC

Hudson-ip siunnersuutigaa anorthositimik (calcium feldspati) piiaaffimmik sananissani ingerlatsinissanilu, Suliniut Qaqortorsuup kangiliani ("Suliniut") Kangerlussuup 80 kilometerinik kujataata-kippassissuani aammalu Sisimiut 80 kilometerinik kujataata-kangisissuani inissisimavoq. Suliniut tassaavoq piiaaffik ammasoq mikisoq (300 m x 400 m), oqimaatsunut aqqutissiaq 10 km, suliffeqarfittut sanaartugaq aamma quersuaq, aatsitassarsiornermi sinnikunut sanaartugaq aamma Kangerlussuarmi umiarsualivik. Suliniutip ukiumut ujaqqat anorthorsitit 285.000 tonsit ukiumut (tpy) aatsitassarsiariniarpai suliaralugillu aamma 200.000 tonsit ukiumut Europamut aamma Amerika Avannarlermut E-Glass glasfiberiliornermi atortussanngorlugit nassiunneqartartussat. Igitassat 85.000 tonsit missaat ukiut tamaasa pilersinneqartassapput aammalu isumannaatsumik peerneqartassallutik tasermi mikisumi suliaqarfittut sanaartukkamit 6 kilometer-isut ungasitsigisumi inissisimasumi. Igitassat akoorutissanik toqunartortalinnik sunilluunnit imaqanngillat.

Ingerlatsinerup nalaani, Suliniut 61-it missaannik ukiumut piffissaq tamakkerlugu sulisoqarniarpoq. Sanaartornerup nalaani inuit 20-t pisariaqartinneqassapput. Suliniut naatsorsuutigineqarpoq minnerpaamik ukiut 20-t ingerlanneqassasoq. Hudson-ip sulisutut anguniagarai minnerpaamik 80%-inik kalaallinik sulisoqarnissaq aatsitassarsiorfiup ingerlanerani aamma 50%-inik sanaartornerup nalaani.

Suliniut naatsorsuutigineqarpoq DKK 175.1 aamma 209.7 million-it akornanni akissarsianit akileraarutinit aamma akitsuutitigut akileraarutinit pilersitsinissaa suliniutip ukiuni 20-ni siullerni ingerlanerani. Annertunerpaamik tuniseqataasussatut ilimagineqarput tassaassasut Suliniummi sulisut akissarsianit akileraarutaanniissasut aamma suliffeqarfiup akitsuutitigut akileraarutaannit tamaani suliffeqarnermi amerlisaatissatut sunniutaasoq. Kalaallit Nunaanni Naalakkersuisut nioqqutissiornermi akitsuummik 2.5%-imik ilanngussinerat isumaqarpoq akitsuut Hudson-imit Suliniutip ingerlanerani ukiut tamaasa pissarsiarineqartassasoq, apeqqutaatinnagu imminut akilersinnaanersoq. Malugisariaqarpoq nuussinermi aningaasartuttit suli naalakkersuisunut isumaqatigiinniutaassariaqarmata, tamannalu akileraarnermut iluanaarutit aalajangiutivinnissaannut sunniuteqarsinnaalluni.

Ingerlatsinerup nalaani, ukiumut DKK 31.4 million-it missaat Kalaallit Nunaanni atorneqartassapput, taakkunani DKK 12.5 million-it tassaassapput sulisut akissarsiaannut aningaasartuutit. Sinneruttut DKK 18.9 million-it Kalaallit Nunaanni nioqqutissanut aamma sullissinernik pisinermut atorneqassapput.

Kalaallit Nunaanni piiaaffik atortulersorneralu 96 million DKK akeqassasut naatsorsuutigineqarpoq.

Nalunaarusip uuma siunertarivaa Suliniutip sumiiffimmi nunap ilaani misissuiffimmi nunaqarfinni illoqarfinnilu isumaginninnermi pissutsinut pioreersunut sunniutai. Nalilersuinermi uani periaatsinut ilaapput Suliniummut tunngatillugu isumaginninnermut apeqqutit pingaarnerit tamarmik suussuserneri. Tassani pineqartunut ilaapput Suliniutip piffissalernera, sumiiffia, nunap ilaani inoqatigiinnut atassuteqarneq, avatangiisit, sulisut aamma aningaasaqarneq. Taakku "nalilersuinermi suussusersiutit" nalilersorneqarput aamma sunniutit pitsaanngitsut annikillisinniarlugit iluarsiissutit imaluunniit nungutinniarlugit imaluunniit suliniummit iluaqutit annertusiniarlugit siunnersuutigineqarput.

Inuiaqatigiinnut Sunniutissanik Nalilersuinerup (SIA) siunertaasa ilagaat iluaqutissanut aamma sunniutinut pilersaarummik ineriartortitsinermi tapersiissalluni, taanna Sunniutissat Iluaqutissallu pillugit Isumaqatigiissut (IBA) inoqarfiit sunnertittut aamma soqutigisaqaqatigiit akornanni isumaqatigiinniarnermi tunngavittut atorneqartussaavoq. IBA-p nassuiaasissavaa Hudson-ip, inuiaqatigiinni oqartussat aamma nunaqqatigiinni oqartussat akornanni suleqatigiinneq ineriartornermi periarfissat annertusarneqarnerinut aamma suliniummit innarliinaveersaarluni sunniutinut atatillugu. Hudson-ip Inuussutissarsiornermut, Aatsitassaqarnermut Suliffeqarnermullu Naalakkersuisoqarfik (MIMR) IBA-p suliarineqarnik suleqatiginiarpaa.

Nalunaarusiami uani nalilersuinermi suussusersiutit nalilersornerannut takussutissiat

Sulisut tamarmik

Qaqortorsuup kangiliani suliniutip siunnersuutigaa sulisut paarlagaattumik ingerlanneqarnissaat. Paarlagaattumik sulinissaq pillugu inaarutaasumik aalajangiisoqarumaarpoq sulisorisassatut ilippanartut itinerusumik tusarniaaffigineqareerpata. Kalaallit piniarneq aalisarnerlugu kisiat inuussutigiunnaarsimagaluaraat, ilitsoqqussat suli atajuarput piorsarsimassutsimut peqataallutik. Tamaammat, kaaviaartumik sulinerit ilippanarpoq sunniuteqarsinnaasut inuulluarnermut, ataqatigiinnermut, timikkut tarnikkullu peqqissusaannut sulisut, ilaqutaasa aamma inoqatigiit.

Suliniummut atatillugu aalajaatsumik isertitaqarneq ilimagineqarpoq inunnik periarfissiissasoq peqqinnerusumik inooriaaseqalernissamut, ilanngullugit aningaasaateqarneq pitsaanerusunik pisiassanik sullissinernillu pisisinnaalerneq. Paarlagaattumik sulinissamut pilersaarutit malugineqarsimapput periarfissiisut ilitsoqqussat malillugit piniarneq sivisunerusumik ingerlanneqarsinnaasoq assersuutigissagaanni "qulingiluaniit tallimanut" sulisarneq sapaatip akunnerup naanerani sulinngiffilik.

Aappaatsigut, pisuujuneruneq ilippanarpoq timikkut tarnikkullu peqqissusermut pitsaanngitsumik sunniuteqarsinnaasutut pissutigalugu ikiaroornartunik atornerluinerulerneq aamma Suliniummi sulisut pitsaanngitsumik inoqatigiinni nappaateqarlernerannik. Tassunga ilaasinnaapput annerusumik imigassamik, hashimik (aamma ikiaroornartunik inerteqqutaasunik allanik), cigarettinik atuilernermik aamma aningaasanoornerulernermik.

Suliniutip sunniut tamanna pakkersimaarniarpaa suliffimmi, najugaqarfinni aamma paarlagaalluni suliartornermi imaluunniit sulinngifeqalerluni ingerlaarnermi, Suliniutip killiffii tamakkerlugit, ikiaroornartut imigassallu akuersaanngilluinnarnerinik atulersitsinermik. Sulisunut ilaqutaanullu ikiorsiilluni pilersaarut aamma sulisunut ilaqutaannullu atornerluisunut taakkununngalu atatillugu tarnikkut peqqinnermik ajornartorsiuteqartunut atugassiissutiginiarpaat.

Peqqissuseq aamma Isumannaassuseq

Sumiiffimmi nunap ilaani misissuiffimmi najugaqartunut aamma sulisunut suliffimmi avatangiisinit aamma ajunaarnernik nalorninartoqarpoq. Hudson-ip sunniutit tamakku pakkersimaniarpai peqqissusermut, isumannaassusermut aamma avatangiisinut politikkimik pilersitsinikkut. Tassunga ilaassapput peqqissusermut aamma isumannaassusermut sungiusaanerit sulisunut tamanut kalaallisut, qallunaatut aamma tuluttut. Suliniummik ingerlatsinerit isumannaassusermik ukkatarinninneq aamma misissuineq aammalu atortussanik aserfallatsaaliuineq tassani pingaarnertut ilaassapput. Sulliviit (aatsitassanik piiavik, aqqusernit, illuliat aamma atortussat) tamanut tikeqqusaassanngillat taamaallaat tamaani ingerlatsinissamut imaluunniit atortussanut sungiusarneqarsimasut tamaaniissinnaapput. Sumiiffimmi peqqinisssamut isumaginniffimmik pilersitsisoqassaaq tassunga ilanngullugu peqqinnissamik isumaginnittumik tamaaniittussamik atorfinitsitsisoqassaaq.

Avatangiisinut sunniutit

Soorlu aatsitassarsiorluni suliniutini suniluunniit eqqaasuuteqartoqassajunnarsivoq qanoq Suliniutip ineriartornerata aserorterinerisa (imaluunniit mingutsitsinerisa) kinguneqarneranut makkuninnga ilitsoqqussaralugu nerisassanik katersisarnerit ilagalugit uumasut, aalisakkat aamma naasut nerisassiornermi aammalu piorsarsimassutikkut susoqartillugu atorneqartartut. Eqqasuutit tamakku pakkersimaarniarlugit, Hudson-i ilinniartitsiniarpoq sumiiffimmi nunap ilaani misissuiffimmi najugalinnut qanoq aatsitassarsiorneq ingerlassanersoq. Aatsitassarsiorfik ingerlanneqassaaq ujarassiorfittut, ingerlatsineq kalalllinit amerlanernit ilisimaneqareersoq Seqimi Olivinimik piiavimmit. Suliniut akoorutissanik imaluunniit imermik atuinngilaq atortussamik suliarinninnermini, annerusumillu aserorterinerulluni. Anorthositit arlaannaalluniit toqunartumik imaluunniit aatsitassanik oqimaatsunik akoqanngillat. Suliniutip Itillip kangerlua Qaqortorsuup Kangiliata kitaaniittoq sunniiffigissanngilaa, tamanna avatangiisinut annertuumik malussarissuusutut akuerisaavoq.

Hudson-ip ersarissumik ammasumillu attaveqaqatigiinneq inoqatigiinnut ingerlanniarpaa avatangiisinut sunniutaasinnaasut pillugit aamma avatangiisinik nakkutilliinermi iliuutsit inerneri tamanut saqqummiuttarniarpai. Maalaaruteqartarfik pilersinneqarniarpoq ajornartorsiutaasinnaasut Suliniummut attuumassuteqartut pillugit qisuariarsinnaaneq anguniarlugu. Avatangiisinut navianarsinnaasut pillugit nalilersuineq tamakkiisoq allaaserineqarsimavoq Avatangiisinut Sunniutaasinnaasunik Nalilersuinermi (EIA).

Piorsarsimanermi pissutsit

Itsarsuarnitsanik misissuineq ingerlanneqarsimavoq Qaqortorsuup Kangiliani Nunatta Katersugaasivianit Allaffeqarfianillu ingerlanneqartumik juuni 2013-mi tassani nalilersuiffiginiarlugu Suliniuteqarfissaq piorsarsimassusermut pingaaruteqartunik peqarnersoq. Taamaallaat itsarsuarnisaq pingaaruteqartoq ataaseq nassaarineqarsimavoq tassaasoq talu sumiiffimmi 66V1-00I-096, tamanna Suliniummi piaaffimmi nunap ilaata ilusissaatut siunnersuutigineqartumut akerliuvoq. Nunatta Katersugaasivia Allaffeqarfiallu siunnersuuteqarput piumanerullugu taanna talu akornusersorneqannginnissaa, kisianni piaaffiup aammanerata inissisimaffia allanngortinneqarsinnaanngippat, talumik aserorterineq isumaliutigineqarsinnaasoq, tassami sannaq asseqanngitsuunngimmat. Hudson-ip iliuusaasinnaasut tamaasa piareersaatiginiarpai talu illersorniarlugu, aamma ajornanngippat, ajoquserneqaqqunagu illuarlugu. Talumut iliuuseriniarneqartoq sunaluunniit Nunatta Katersugaasivianik Allaffeqarfianillu oqaloqatigiissutigineqaqqaassapput sumiiffimmi sumilluunniit allaannguisoqartinnagu. Nassaartoqariasaarnermi ingerlatseriaatsinik pilersitsisoqarniarpoq sanaartornermi aamma ingerlatsilluni sulinermi itsarsuarnitsanik sunilluunnit Suliniutip ingerlanerani nassaarineqartunik innarliinaveersaarniarluni.

Piniarneq aamma Aalisarneq

Kalaallit Nunaat sakkortuumik ilitsoqqussaqarpoq piniarnermik, aalisarnermik aammalu pinngortitami isumalluutinik atuilluarnermik, taakkulu nunap piorsarsimanerata aamma aningaasarsiornerata sannaanut akuulluinnarput. Nunamik, imarmik aamma isumalluutinik atuineq aamma taamatulli pingaaruteqartigipput sumiiffimmi nunap ilaani misissuiffissami, tamaani najugaqartut piniartarput aamma aalisarlutik sunngiffimmi sammisaqarneq, aningaasatigut iluanaarniarneq aamma inuussutissarsiorneq siunertaralugu. Suliniut ilippanarpoq nunamik, imermik aamma isumalluutinik atuinermik toqqaannartumik sunniissasoq sunngiffimmi/pinngortitami nunap ilaannut orniguttarfiit allangortinnerisigut. Tassunga ilaapput pujoralak, nipiliorneq aamma annertunerusumik Suliunitip inissisimaffianik atuinerup sunniiffiginnissinnaanera piniarnermut, aalisarnermut aamma isumalluutinik pissarsiornermut sunngiffimi sammisatut aamma inuussutissarsiornermik siunertatut. Nunap ilaanut tamaanga annertunerusumik atuinerulersinnaaneq pakkersimaarniarlugu, Suliniummut aqqut privatiussaaq aammalu tamanut ammasuunani inerteqqutaassalluni.

Pingaaruteqarpoq malugissallugu Suliniut Itillip kangerluanut sunniuteqassanngimmat, tamanna avatangiisinut annertuumik malussarissuusutut akuerisaavoq maannakkut inoqatigiinnut tamaaniittunut pingaaruteqarluni aalisarfittut, piniarfittut aamma sunngiffimmi sammisarqarfittut aammalu itsarsuanitsanik misissuinermut pingaaruteqarluni.

Suliffinnik nutaanik nunap ilaani tamaani pilersitsinerup kingunerisinnaasaatut ilippanarsinnaasoq ataaseq tassaavoq aningaasatigut iluanaarniarluni piniartut aamma aalisartut Suliniummi suliffittaarniarlutik sammisatik qimassinnaagaat, annikinnerusumik siulinit eqqaamasat periaatsillu inoqataasunut allanut ingerlatseqqinnerisa annikillinerinik kinguneqartumik.

Hudson-ip tapersersorniarpai kommunip pilersaarutai siunertaqartut taakkuninnga pingaarutilinnik inoqatigiit piorsarsimanerani iliuutsinik siuarsaanissamut sumiiffimmi nunap

ilaani misissuiffiup iluani, sunniutaasinnaasoq taanna pakkersimaarniarlugu. Pisarneq malillugu nerisarisat aamma sallaalliutigineqartassapput suliffeqarfimmi sulisunut kinguneralugu annertunerusumik piniakkanik aalisakkanillu tunisiffissamik periarfissaqarneq.

Suliniuteqarfimmit erngup kuuttup pitsaassusaa aalajangersimasumik pisartumik nakkutigineqassaaq avatangiisinik nakkutilliinermut pilersaarummut ilanngullugu. Suliniut kinguneqarsinnaavoq pinngortitamik aamma nunap isikkuanik suliniuteqarfimmi atajuartumik allanngortitsinermik. Sunniut tamanna pakkersimaarniarlugu aatsitassarsiorfimmik matusinermut aamma nunanngortitseqqinnermut pilersaarut ineriartortinneqassaaq aammalu atulersinneqarlunilu.

Inerniliineq

Innarliinaveersaarluni iliuusissat atulersinneqarnerisa kingorna, Inuiaqatigiinnut Sunniutissanik Nalilersuinerup (SIA) aalajangiuppaa Suliniummit inoqatigiit avatangiisaannut pitsaanngitsunik kinguneqanngitsoq. Suliniut iluaqutissanik arlalinnik siunissaq ungasinnerusoq eqqarsaatigalugu kinguneqassaaq ilagalugit:

- Toqqaannartumik, toqqaannanngitsumik pilersinneqartunik atorfinitsitsinerit;
- Nerisassanik, ikummatissanik aamma kiffartuussinernik nunaqqatigiinnit pisinerit;
- Ingerlatsiviup isertitaanit aamma inuit isertitaannit akileraarutinit isertitat;
- Nunaqqatigiinni inuiaqatigiinnilu aningaasaqarniarnerannik siammarterinerit; aamma
- Sulisut pisinnaasaannik ineriartortitsineq Suliniummi sulisunut.

Resumé

Dansk

Hudson foreslår at bygge og drive en anorthositmine (calcium-feldspat) ved Qaqortorsuaq ("Projekt") 80 kilometer sydvest for Kangerlussuaq og 80 kilometer sydøst for Sisimiut. Projektet består af et lille (300 m x 400 m) åbent brud, 10 km tilkørselsvej, forarbejdningsanlæg og lagerbygning, bortskaffelsesområde for mineaffald og en havnefacilitet på den nordlige bred af Søndre Strømfjord. Projektet skal bryde og forarbejde 285.000 tons anorthosit pr. år, og sende 200.000 tons pr. år til Europa og Nordamerika til brug for fremstillingen af glasfiber til E-glas. Den årlige produktion af ca. 85.000 tons affaldsmateriale bortskaffes forsvarligt i en lille sø, som ligger seks kilometer fra forarbejdningsanlægget. Affaldsmaterialet indeholder ingen kemikalier eller giftige elementer.

Projektet vil under driften årligt beskæftige ca. 61 medarbejdere på fuld tid. Selve anlægsfasen kræver 20 medarbejdere. Projektet forventes at vare i mindst 20 år. Hudsons egen målsætning er minimum 80 % grønlandsk arbejdskraft under hele minens driftsperiode og 50 % i anlægsfasen.

Projektet forventes at generere mellem 175.1 og 209.7 millioner DKK i direkte og indirekte skatter i løbet af de første 20 år af projektets levetid. Direkte indkomstskat fra projektets ansatte og indirekte skatter fra den bredere virkning på økonomien, som et resultat af denne beskæftigelse, forventes at udgøre det største bidrag. En royalty på 2,5 %, som opkræves af Naalakkersuisut, betyder, at Hudson betaler skat for hvert år, minen er aktiv, uanset dens afkast.

I driftsfasen vil der blive brugt cirka 31,4 millioner DKK hvert år i Grønland; heraf vil cirka 12,5 millioner DKK være direkte udgifter til arbejdskraft. De resterende 18,9 millioner DKK vil blive anvendt til indkøb af materialer og tjenester i Grønland.

Anlæggelse af minen og tilhørende faciliteter i Grønland er vurderet til at koste 96 millioner DKK

Formålet med denne rapport er at vurdere projektets indflydelse på byernes og bygdernes eksisterende sociale vilkår i det lokale undersøgelsesområde. Trinnene i denne vurdering omfatter identifikation af hovedspørgsmålene angående alle projektets sociale aspekter. Disse omfatter projektets tidsplan, placering, dets forhold til lokalsamfundene, miljøet, arbejdsstyrken og økonomien. Disse "vurderingsindikatorer" vurderes herefter, og der foreslås løsninger, som reducerer eller eliminerer alle projektets negative påvirkninger, og forstærker de positive.

Et af målene med denne VSB er at medvirke til udviklingen af en plan vedrørende fordelene og påvirkningerne, som vil blive brugt som grundlag for forhandlingen af en Impact Benefit Agreement (IBA-en), med de berørte lokalsamfund og interessenter. IBA-en vil fastlægge

samarbejdet mellem Hudson, de nationale og lokale myndigheder med henblik på at maksimere udviklingsmulighederne og afbøde projektets påvirkninger.

Eksempler på vurderingsindikatorer, som er vurderede i denne rapport

Arbejdsstyrken

En endelig beslutning om vagtplanerne for rotationerne vil blive fastlagt efter yderligere konsultation af fagforeninger, relevante byer og bygder og Arbejdstilsynet i Grønland. Selvom grønlændere ikke længere kun lever af jagt og fiskeri, så er jagt og fiskeri stadig en integreret del af kulturen. Derfor kan arbejde i rotationerne have en potentiel indvirkning på de ansattes, deres familiers og lokalsamfundenes velbefindende, samhørighed og fysiske og psykiske sundhed. Samtidig vil en stabil indkomst fra dette projekt give de lokale medarbejdere penge til at øge familiernes velstand.

Internationale erfaringer viser, at industriprojekter potentielt kan lede til et øget forbrug af alkohol og andre rusmidler. Projektet vil derfor implementere en nul-tolerance politik for stoffer og alkohol på arbejdspladsen, i lejren og under transport til og fra rotationerne i alle projektets faser. Et hjælpeprogram for medarbejdere og deres familie vil også være til rådighed for eventuelle ansatte og deres familier, som er ramt af misbrug og relaterede psykiske problemer.

Sundhed og sikkerhed

Beboere i det lokale undersøgelsesområde og ansatte er udsat for en risiko for arbejdsrelaterede sygdomme og ulykker. Hudson har til hensigt at afbøde disse effekter ved at udvikle en sundheds-, sikkerheds- og miljøpolitik. Denne vil omfatte træning i sundhed og sikkerhed for alle medarbejdere på grønlandsk, dansk og engelsk. Projektets aktiviteter har sikkerheden som højeste prioritet, og inspektion og vedligeholdelse af udstyret vil være et centralt punkt i dette. Arbejdspladser (minebruddet, veje, bygninger og udstyr) vil ikke være tilgængeligt for andre end dem, som er oplært i at arbejde på det pågældende sted eller med det pågældende udstyr. I mineområdet vil der blive indrettet sundhedstjenester med bl.a. ansættelse af en sundhedsmedarbejder.

Virkninger på miljøet

Som for alle mineprojekter vil der være bekymringer om, hvordan projektets udvikling kan føre til forstyrrelser (eller forurening) af jagt og fangst, herunder dyr, fisk og planter, samt kulturelle aktiviteter. For at mindske disse bekymringer, vil Hudson undervise beboerne i undersøgelsesområdet i, hvordan minedriften vil finde sted. Minen vil fungere som et stenbrud, en proces som sandsynligvis allerede er kendt for de fleste grønlændere fra lokale stenbrud. Projektet anvender ikke kemikalier eller vand til forarbejdningen; forarbejdningsprocessen består overvejende i knusning af materialet. Anorthosit indeholder ikke nogen former for giftige stoffer eller tungmetaller. Projektet vil ikke påvirke Itilleq Fjord vest for Qaqortorsuaq, som er kendt for sin betydelige miljømæssige følsomhed.

Hudson vil opretholde en tydelig og åben kommunikation med lokalsamfundene om mulige virkninger på miljøet og vil offentliggøre alle resultater af de gennemførte miljømæssige overvågningsaktiviteter. Der vil blive oprettet en klageinstans, som kan svare på potentielle problemer relateret til projektaktiviteter. En samlet vurdering af de miljømæssige risici findes i redegørelsen for Vurderingen af Virkninger på Miljøet (VVM).

Kulturelle anliggender

Grønlands Nationalmuseum og Arkiv (NKA) har i juni 2013 udført en arkæologisk undersøgelse ved Qaqortorsuaq (*Qaqortorsuup Kangilia*) med henblik på at vurdere projektområdets kulturelle betydning. Kun et af de arkæologiske kendetegn, nemlig et skydeskjul på stedet 66V1-00I-096, er i konflikt med det skitserede mineområde. NKA har udtalt, at det vil være mest hensigtsmæssigt ikke at berøre skydeskjulet, men hvis det ikke er muligt at ændre ved minebruddets design, kan en påvirkning af skydeskjulet komme i betragtning. Hudson vil tage alle mulige forholdsregler for at beskytte skydeskjulet. Ethvert indgreb på skydeskjulet vil blive drøftet med NKA inden de pågældende ændringer udføres på stedet. Der vil også blive tilrettelagt en procedure for tilfældige arkæologiske fund i forbindelse med anlæggelse og drift af minen. Procedurens formål er at minimere påvirkningerne på disse fund.

Jagt og fiskeri

Grønland har en stærk tradition for jagt og fiskeri og brugen af de levende ressourcer. Denne tradition er en solid grundsten i landets kulturelle og økonomiske struktur. Brugen af land, vand og ressourcer er således også væsentligt i undersøgelsesområdet, hvor beboerne jager og fisker på baggrund af såvel rekreative, forretningsmæssige som subsistensmæssige formål. Projektet har potentiale til at påvirke brugen af land, vand og ressourcer direkte ved at ændre adgangen til rekreative og/eller naturområder. Desuden kan støv, støj og øget trafik i projektområdet eventuelt påvirke jagt-, fiskeri og indsamlingsaktiviteter, både med rekreative eller subsistensformål. Med henblik på at afbøde den potentielt øgede trafik i området, vil projektets adgangsvej være privat, og offentlig adgang vil ikke være tilladt.

Det er vigtigt at bemærke, at projektet ikke vil påvirke Itilleq Fjord, som er kendt for sin betydelige både historiske og nuværende betydning for lokalsamfundenes jagt og fiskeri samt rekreative aktiviteter, ligesom landområdet har en betydelig arkæologisk værdi.

Hudson vil støtte lokale programmer, som har til formål at styrke traditionelle erhverv. Grønlandske madvarer vil således være til rådighed for medarbejderne i mineområdet, hvilket vil give en øget mulighed for, at fiskere og fangere kan sælge deres jagtbytte. Hudson vil samarbejde med de grønlandske fødevaremynigheder for at udarbejde et regelsæt for køb af fødevarer fra lokale fiskere og fangere. Betingelserne for salg af fødevarer til mineprojektet vil blive gjort tilgængeligt på selskabets hjemmeside.

Projektets nedstrømsvandkvalitet vil regelmæssigt blive kontrolleret som en del af miljøovervågningsprogrammet. Projektet kan resultere i en varig ændring af naturen og landskabet i projektområdet. Med henblik på at afbøde denne virkning, vil der blive udviklet og

implementeret en nedluknings- og genopretningsplan for lukning og genindvinding af mineområdet.

Konklusion

Efter implementering af de afbødende foranstaltninger, er det i VSB-en slået fast, at der ikke vil forekomme vedvarende negative virkninger fra projektet på de sociale omgivelser. Projektet vil resultere i flere langvarige fordele, herunder:

- Direkte, indirekte og afledt beskæftigelse;
- Anskaffelse af levnedsmidler, brændsel og tjenester fra lokale forretninger;
- Indkomster fra selskabs- og personskatter;
- Diversificering af den lokale og nationale økonomi; og
- Udvikling af kompetencerne hos de ansatte i projektet.

Table of Contents

1.0 INTRODUCTION 1

2.0 PROJECT DESCRIPTION 3

2.1 Project Location 3

2.2 Description of the Project 4

2.2.1 Mining 4

2.2.2 Processing Facility 6

2.2.3 Project Site Layout 7

2.2.4 Port Facilities and Transport 8

2.2.5 Tailings 9

2.2.6 Infrastructure and Camp Complex 9

2.2.7 Power Source 10

2.2.8 Personnel 11

2.3 Closure and Reclamation 11

2.4 Proposed Project Schedule 12

2.5 Operations in Greenland 12

2.5.1 What is Milling? 12

2.5.2 Is Milling Necessary? 12

2.5.3 Power Requirements 13

2.5.4 Material Handling and Shipping 14

2.5.5 Project Economics 15

2.6 Mitigation and Enhancement Measures Inherent in Project Design 16

2.7 SIA and Permitting Activities 19

3.0 ASSESSMENT APPROACH 23

3.1 Policy, Legal and Administrative Framework 23

3.2 Methodology 24

3.2.1 Key Questions 25

3.2.2 Assessment Indicators 25

3.2.3 Temporal, Spatial and Administrative Boundaries 26

3.2.3.1 Temporal Boundaries 26
3.2.3.2 Spatial and Administrative Boundaries 27
3.2.4 Likely Effects 28
3.2.5 Mitigation and Social Management Measures 28
3.2.6 Classification of Residual Effects 28
3.3 Summary of Existing Conditions 31
3.3.1 Economy 31
3.3.2 Education and Training 31
3.3.3 Public Services and Economic Development 32
3.3.4 Social and Health 32
3.3.5 Cultural and Natural Values 33
3.4 Summary of Stakeholder Engagement Results 33
4.0 IMPACT ASSESSMENT 34
4.1 Economic Effects 34
4.1.1 Employment 34
4.1.2 Local Procurement 39
4.1.3 Economic Growth and Diversification 40
4.1.4 Employment Incomes 41
4.1.5 Taxation Effects 41
4.2 Education and Training 46
4.2.1 Workforce Skills Development 46
4.2.2 National and Local Education 47
4.3 Public Infrastructure, Services and Economic Development 48
4.3.1 Physical Infrastructure 48
4.3.2 Social Infrastructure 50
4.3.3 Pressure on Planned Developments 53
4.4 Social and Health Effects 54
4.4.1 Demographics and Population 54
4.4.2 Land Acquisition and Displacement 56
4.4.3 Community Well-being 57

4.4.4 Physical and Mental Health 59
4.4.5 Environmental Impact 61
4.4.6 Occupational Health and Risk of Accidents 62
4.4.7 Perceptions of Harm 64
4.5 Cultural and Natural Values 64
4.5.1 Cultural Heritage (Archaeology) 65
4.5.2 Recreational Land and Resource Use 66
4.5.2.1 Direct Effects on Hunting 66
4.5.2.2 Direct Effects on Fishing 68
4.5.2.3 Indirect Effects on Hunting and Fishing 69
4.5.2.4 Effects on Other Land and Resource Uses 71
4.5.2.5 Effects on Tourism 71
4.5.3 Land and Resource Use for Livelihoods 72
4.5.4 Nature and Landscapes 74
4.6 Residual Effect Classification 74
4.6.1 Economy 74
4.6.2 Education and Training 75
4.6.3 Public Infrastructure, Services and Economic Development 75
4.6.4 Social and Health Effects 75
4.6.5 Cultural and Natural Values 76
4.7 Monitoring and Follow-up 76
4.7.1 Economy 76
4.7.2 Education and Training 76
4.7.3 Public Infrastructure, Services and Economic Development 76
4.7.4 Social and Health Effects 77
4.7.5 Cultural and Natural Values 77
4.8 Impact Assessment Summary 77
5.0 ANALYSIS OF ALTERNATIVES 82
6.0 MONITORING AND EVALUATION PLAN 84
7.0 REFERENCES 92

TABLES

Table 1: Social Indicators 26
Table 2: Temporal Boundaries 26
Table 3: Local Study Area Communities 27
Table 4: Social Impact Assessment Criteria 29
Table 5: Estimated Number of Processing Plant Employees, Operation Phase 36
Table 6: Estimated Number of Positions at the Mine Site, Operations Phase 37
Table 7: Estimated Number of Contractors Employees, Operations Phase 38
Table 8: Summary of Estimated Tax Revenue Contribution from the Project 41
Table 9: Estimated Greenland Income Tax Directly Attributable to Employment at the Project 45
Table 10: Impact Assessment Summary 78
Table 11: Monitoring and Evaluation Plan 85

FIGURES

Figure 1: Project Location 2
Figure 2: Project Location West Coast of Greenland 2
Figure 3: Aerial View of the Project Area looking towards East (Søndre Strømfjord can be seen in the in the background). 4
Figure 4 - Operation Summary Chart 5
Figure 5: A Detailed View of the Project Layout. The circled area is the proposed tailings disposal site. 7
Figure 6: Process Design for the White Mountain Anorthosite. 8
Figure 7: Location of Tailings Pond 10
Figure 8 - Example of Ball Mill in operation in Europe processing similar material to Hudson's anorthosite. Hudson would require two mills this size. Note the fine powder accumulation on the floor 13
Figure 9 - Example of Milled Product Open Storage 14

1.0 INTRODUCTION

Hudson Resources Inc. (Hudson) is a Canadian mineral exploration company developing the White Mountain (Naajat) Anorthosite Project (the Project). The Project is situated on the central west coast of Greenland at approximately latitude 66°33'N (approximately the Arctic Circle) and longitude 52°10'W. Hudson has a 100% interest in the 95 sq. km exploration license area (EL 2002/06).

Hudson is proposing to establish a mining and processing operation at the Najaat property (Figure 1). The Project includes:

- Open pit mine;
- Processing facility;
- Access roads
- Tailings disposal area
- Port
- Infrastructure and camp complex

Hudson proposes to mine approximately 285,000 tonnes of ore annually and transport 200,000 tonnes of processed material to Europe, North America and Asia. The material will be a key ingredient in the manufacturing of E-Glass fiberglass. Approximately 85,000 tonnes of waste material will be safely disposed of on site annually.

Approximately 30 full time positions are expected to be required at the mine site during operation. After taking into account rotating two shifts, approximately 61 people are required, including 12 contractor positions. The work season for the mining operations will be 9 months, and the processing plant will run 10 months per year. Hudson's objective is to have a Greenlandic workforce making up a minimum of 80% of all positions (or 49 employees).

Along with this Social Impact Assessment (SIA), Hudson has submitted an Environmental Impact Assessment (EIA) and Feasibility Study as its application for an exploitation license to the Government of Greenland's Mineral Licenses and Safety Authority (MLSA). If successful, license issuance will be followed by a construction period beginning in early 2015. The operation is expected to commence in the second half of 2015 or early 2016, and continue for 20+ years. The life of the operation is only limited by the availability and sustainability of international markets to sell the anorthosite material. There are currently sufficient resources defined for at least 120 years of operation.

There is potential to grow the size of the market for the anorthosite and then increase the capacity of the White Mountain operation over time. The current design would allow for an increase in output by 25-50% without the need to increase the footprint of the project or increasing the size of equipment such as trucks and crushers. This would not result in significant social changes as there would not be a need to hire additional staff. Increased production would however provide increased tax revenue to the government as a result of royalties. Any significant increases in production which would result in different social impacts than outlined in this study may require a new or amended SIA.

White Mountain (Naajat EL) Project Location

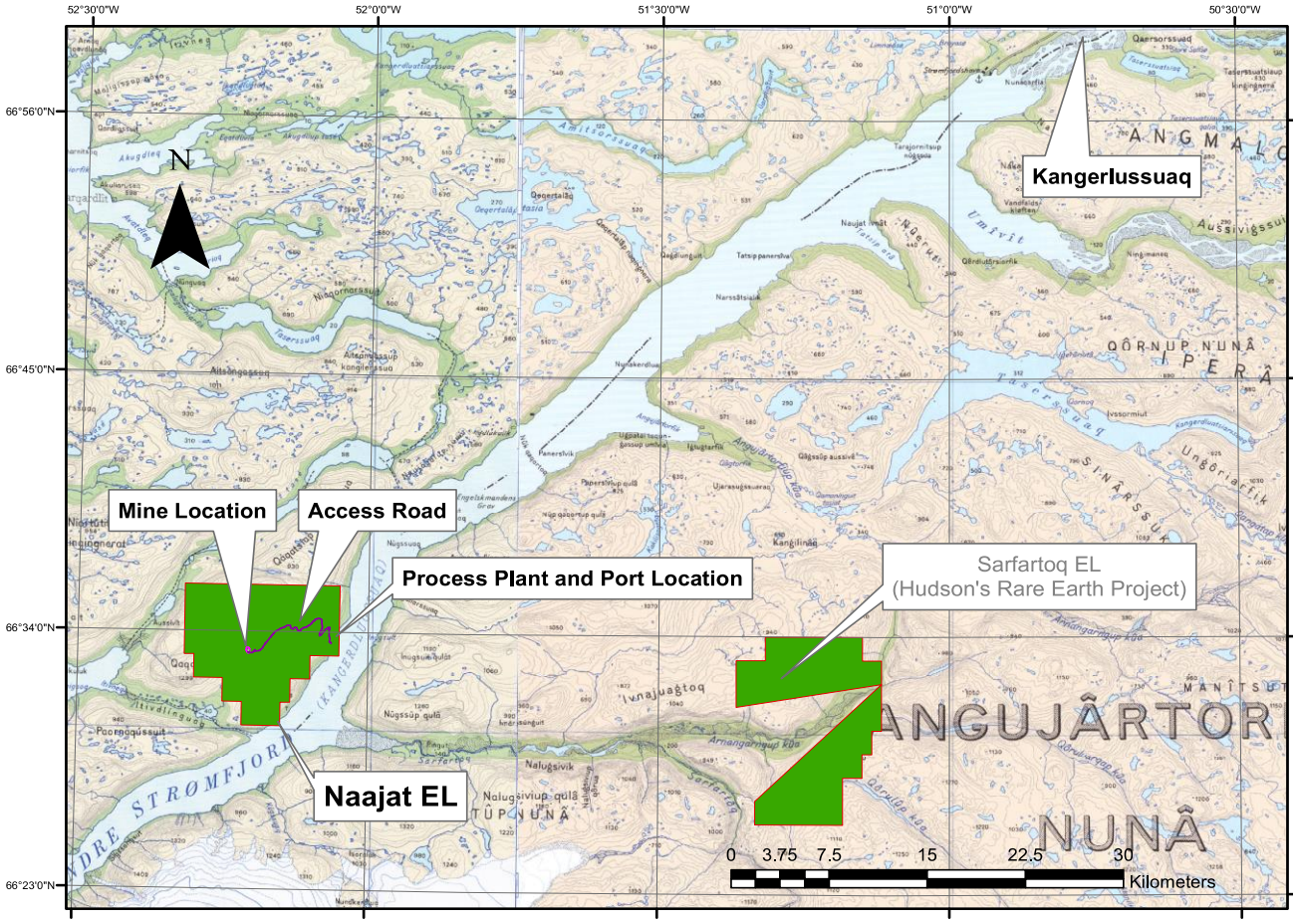


Figure 1: Project Location



Figure 2: Project Location West Coast of Greenland

2.0 PROJECT DESCRIPTION

Hudson is a Canadian mineral exploration company that has maintained interests in Greenland since 2002, exploring for diamonds, rare earths and, more recently, industrial minerals in the form of calcium feldspar (anorthosite). Hudson holds 100 percent interest in two exploration licenses totalling approximately 188 square kilometres (km^2) in the Sarfartoq region. In recent years, Hudson focused its exploration efforts on the Sarfartoq Carbonatite Complex (SCC), located approximately 120 kilometers (km) southeast of Sisimiut, for the purpose of defining an economic deposit of Rare Earth Elements (REEs). Exploration activities in this area have been ongoing since 2009. More recently, Hudson discovered the value of pursuing industrial minerals on the White Mountain (Naajat) exploration license (EL 2002/06). This commodity offers the potential for developing a very simple mining operation similar to a rock quarry. Given the current challenging economic environment, this project offers compelling economic returns with a small capital start-up cost.

Hudson has identified that the White Mountain anorthosite project has three main potential industrial applications:

- As a new source of feedstock to the high end fiberglass (E-glass) industry;
- As a new source of alumina to supply aluminum smelters; and
- As a new source of filler material. Fillers are a significant component in the plastics and paints industries.

2.1 Project Location

The White Mountain (Najaat) Project site is located at latitude 66°33'N (approximately the Arctic Circle) and longitude 52°12'W. The Project site is located approximately 80 km southwest of the international airport at Kangerlussuaq and approximately 80 km to the southeast of Sisimiut, the nearest town.

The anorthosite ore is located in the coastal areas of Søndre Strømfjord. Søndre Strømfjord is typically ice-free from March through to November which allows seasonal boat access to the Project site from nearby communities. The Project site can be accessed year round by helicopter. There is no road between the Project site and nearby communities. A road from the harbour site to the project site is being constructed to transport ore, goods, services and people to and from the Project Site.

The general topography of the Project site consists of rolling hills between an elevation of 450 metres and 560 metres (m) (Figure 3). The Project site and the surrounding vicinity are dissected by large numbers of lakes and brooks.

2.2 Description of the Project

The following sections provide a description of major project components and activities. The physical components of the Project include the following: mine, port, access road, processing facility, worker camp, and the tailings disposal area. Figure 4 below shows the locations of the Project components.

2.2.1 Mining

The property will be mined using open pit mining methods. There is no need for stripping of overburden or waste rock. Due to the topography of the deposit, benching into the hillside is the primary method of extraction. The pit is designed almost entirely within the Indicated Resource so that there is no waste rock in the walls. This enables a conservative slope angle so that slope stability will not be an issue. The material would be drilled and blasted using ANFO (ammonium nitrate and diesel). The operation would involve the mining of approximately 285,000 tonnes per year, roughly 1,000 tonnes per day for nine months.



Figure 3: Aerial View of the Project Area looking towards East (Søndre Strømfjord can be seen in the in the background).

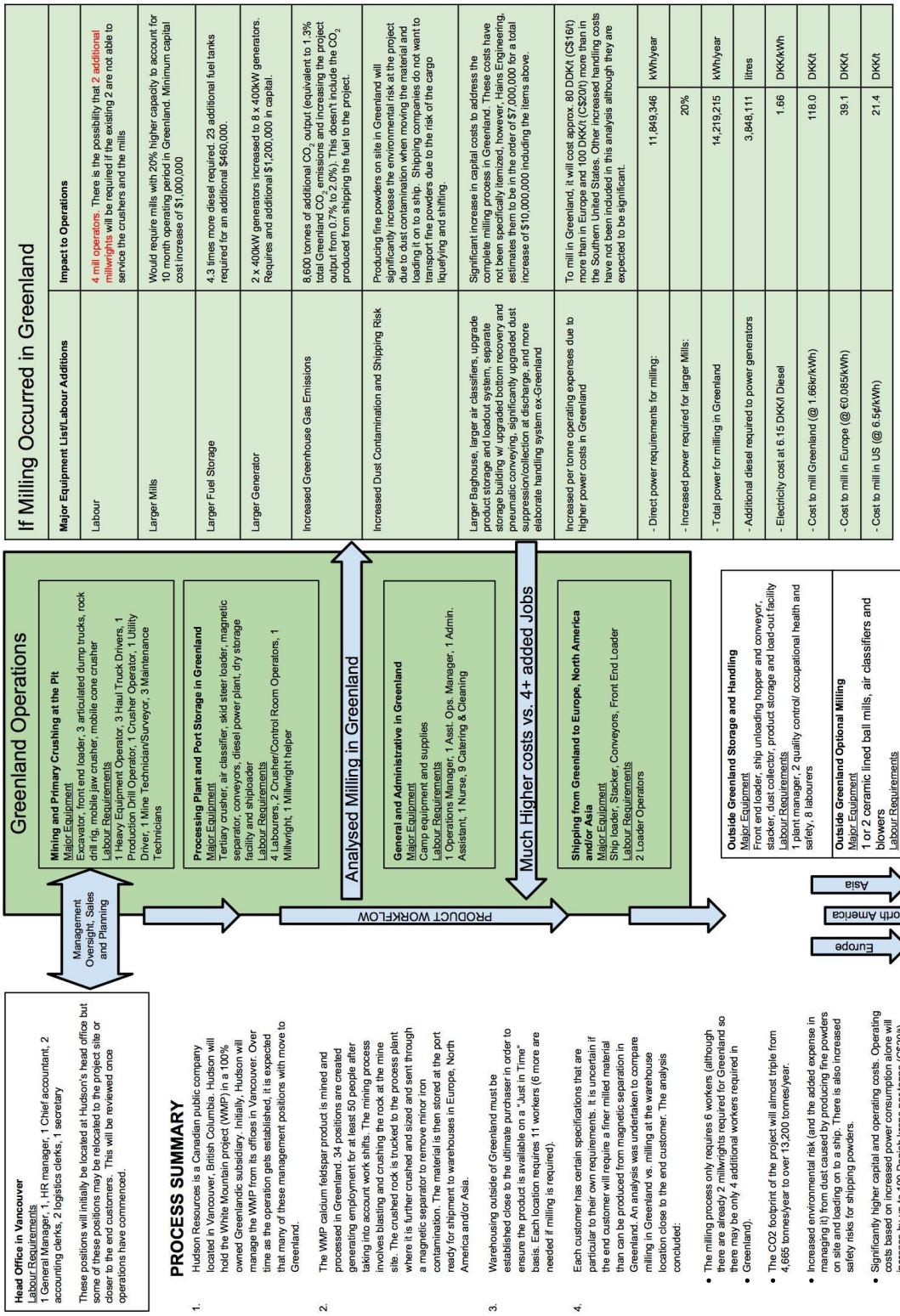


Figure 4 - Operation Summary Chart

Mine trucks will haul ore from the pit face to a 2-stage mobile crushing facility located near the mine. The primary jaw and secondary cone crushers, feed conveyors, and discharge conveyors will be powered by diesel engines. After primary and secondary crushing, the material will be hauled 10 km by trucks to the processing plant located at the port area.

The mining operation would be relatively simple and use the following equipment: one production drill, one excavator, three dump trucks, one grader, one front-end loader, one service truck, one fuel truck, one water truck, one mechanical truck and three passenger vehicles.

2.2.2 Processing Facility

The processing facility is located at the port site. At the processing plant the material is fed into a tertiary crusher and a magnetic separator. Mineral processing is based on crushing to less than 0.841 mm, de-dusting crushed material at 0.074 mm, dry magnetic separation to remove iron contamination. Due to high energy costs and dust and transportation issues, final grinding (if required) of the non-magnetic fraction to less than 0.074 mm will be completed near the end-user in Europe, N.A., and/or Asia. See Section 2.5 for a more detailed analysis on milling options.

The overall process yield (recovery) is estimated at 70%. The process plant in Greenland will operate on a 24 hr/day, 7 day per week schedule for 300 operating days/year (10 months).

The processing plant will operate at approximately 42 tonnes per hour (TPH) and will include the following steps:

- Dust removal to remove very fine particles (15% of the material is taken out at this point);
- Magnetic separation to remove small iron particles which naturally occur in the rock (as mica). Approximately 15% of the material is removed during this step; and
- The final product is then moved by covered conveyor to a large covered storage area at the port facility to be ready for shipping.

2.2.3 Project Site Layout

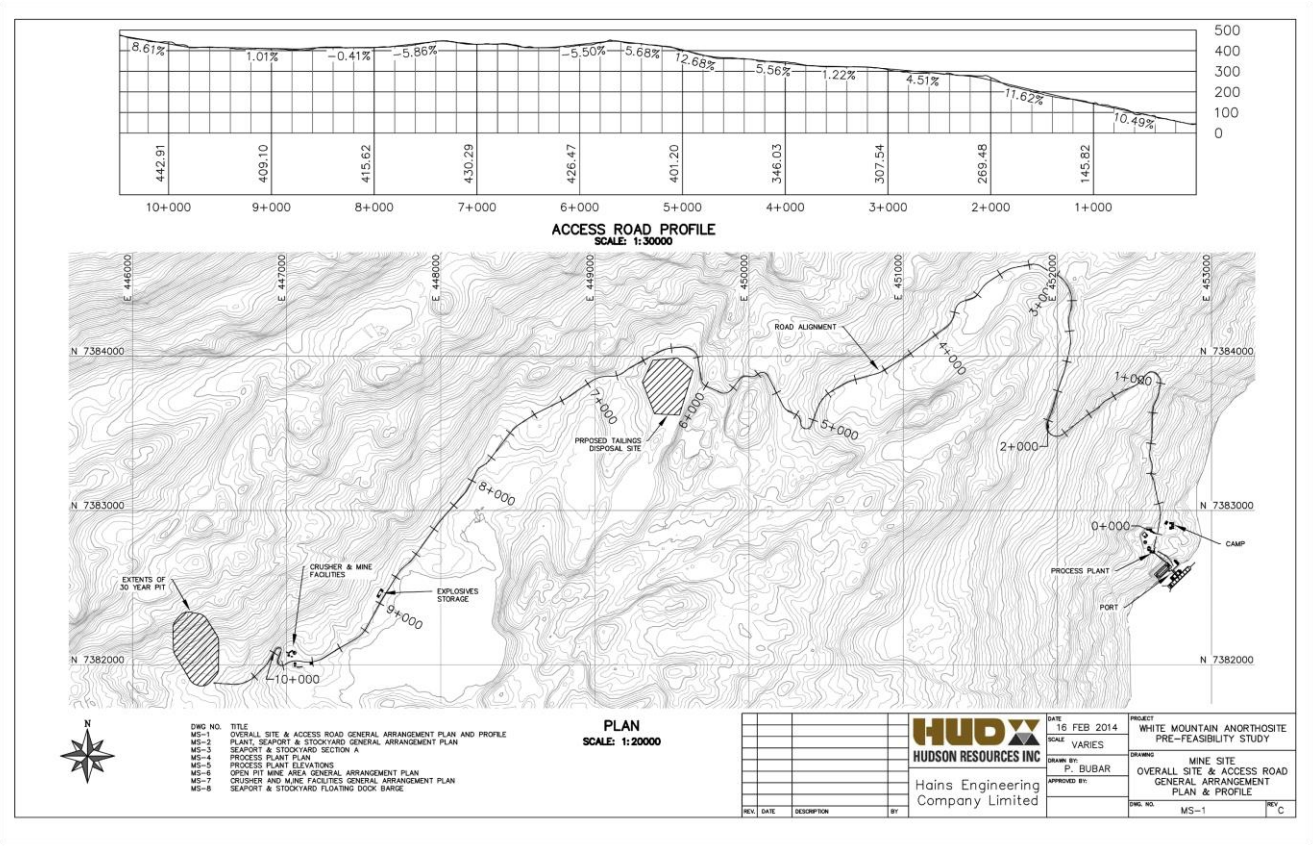


Figure 5: A Detailed View of the Project Layout. The circled area is the proposed tailings disposal site.

The process plant will consist of a vertical shaft impactor (VSI) crusher operated in closed circuit with screens and a Gyrotor air classifier and a dry magnetic separator. Feed material will be crushed to produce an approximate 0.841-.074 mm product. The -.074 mm dust, estimated at approximately 43,000 tonnes per annum (7.3 tonnes per hour) maximum (15% of the mined rock), will be conveyed to a storage bin located outside the process plant prior to disposal in the waste dump.

The dry magnetic separators are required to remove small iron particles, which naturally occur in the rock (as mica). Approximately 15% of the material is removed during this step.

The non-magnetic fraction from the magnetic separators will be conveyed to a bulk storage area where it will be piled using a Stormajor type feeder/stacker system. Due to shipping season limitations and inventory balancing requirements, it is anticipated maximum storage requirements for the final product will be approximately 30,000 tonnes. This will require a building approximately 60 m wide by 100 m long located at the port site in Greenland.

It is planned to undertake processing in Greenland to produce a nonmagnetic product which is between .841 and .074 mm. This will be shipped to Europe and/or North America for distribution to the E-Glass producers. In some cases, further grinding of the material may be required, which may be carried out by Hudson or a third party outside of Greenland closer to the end users.

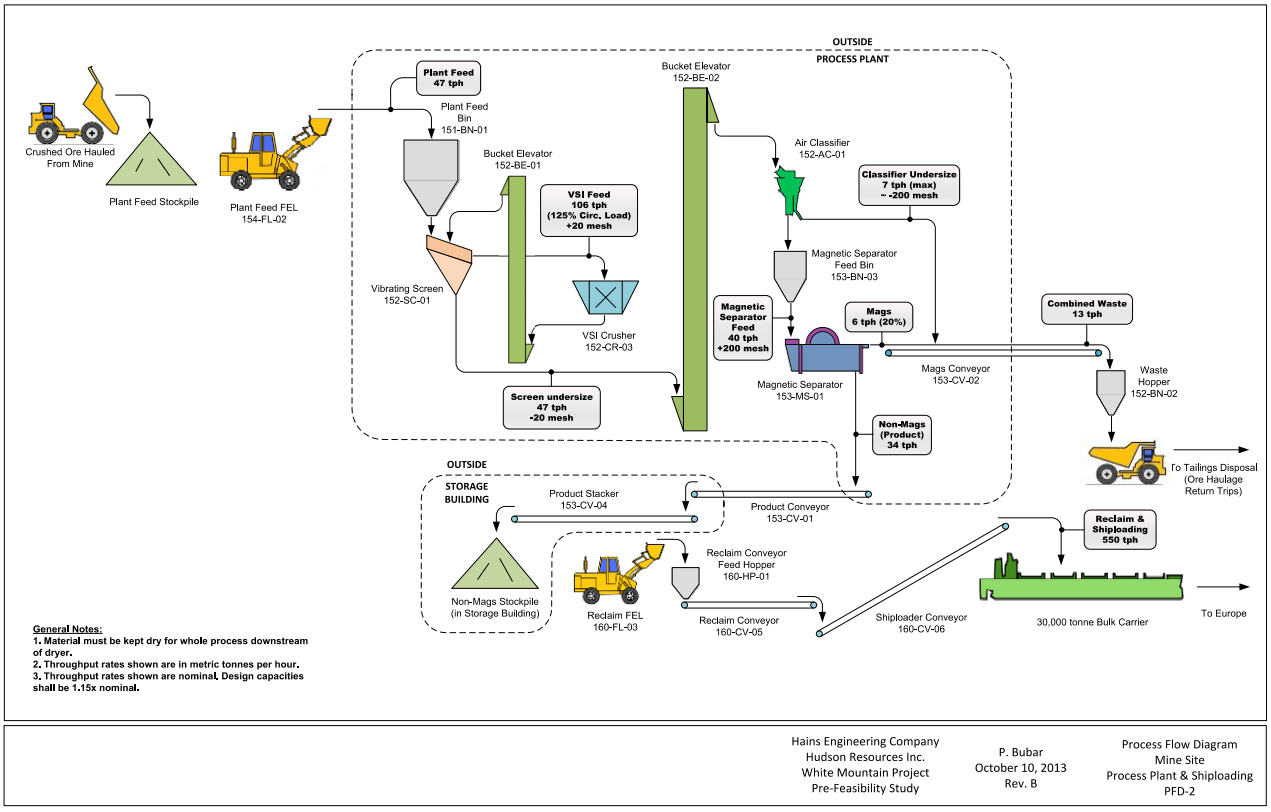


Figure 6: Process Design for the White Mountain Anorthosite.

2.2.4 Port Facilities and Transport

A port facility will be established on the Søndre Strømfjord. The port will be constructed of blasted rock and a pier will not be required due to the steep drop off in water from the shore. A large 80+ metre barge will be used as a floating dock.

The port will include a storage building for the final product and a mobile ship loader. It is expected that the port will load ships eight months per year, and will not operate December through March due to potential ice conditions.

Material will be recovered from storage by front-end loader and conveyed out to the ship-loader conveying system for loading into ships. The conveyors will be covered to ensure the material remains dry and to control dust. The ship-loader will be equipped with a flexible tube dust suppression system and deflector plates to minimize dust generation and permit even

filling of the holds. The design load rate for the ship-loader is 500 TPH with a projected effective capacity of 300 TPH after allowance for ship trimming.

It is anticipated ships will be of the HandySize class (25,000 –35,000 deadweight tonnage). Assuming a typical 30,000 tonne load, loading time will be approximately 100 hours at 300 TPH, with an overall ship station time in Greenland of approximately five days.

2.2.5 Tailings

Tailings (magnetic rejects) are conveyed to the storage bin. From there, the waste is backhauled approximately 6 km to the waste disposal area. Approximately 30% (85,000t/yr) of the mined material is expected to be waste. The plan is to dispose the tailings in Lake A, see Figure 6. Leaching and mobilization tests have been completed to determine the stability of the material. Based on assays, the tailings are expected to be benign and can be safely disposed of underwater.

2.2.6 Infrastructure and Camp Complex

Project infrastructure in Greenland, aside from the process plant facility, storage building and the quarry site, will consist of an accommodation complex, truck shop, diesel power plant and ancillary facilities. The accommodation complex will house approximately 30 staff. The complex is located in the northeast corner of the site (Figure 4).

The following facilities will be part of the mine:

- 10 km road connecting the pit, process plant and port facility;
- Housing complex for workers;
- Work shop and maintenance building;
- Fuel storage facility;
- Explosives storage facility; and
- Diesel generator building for all on-site power.

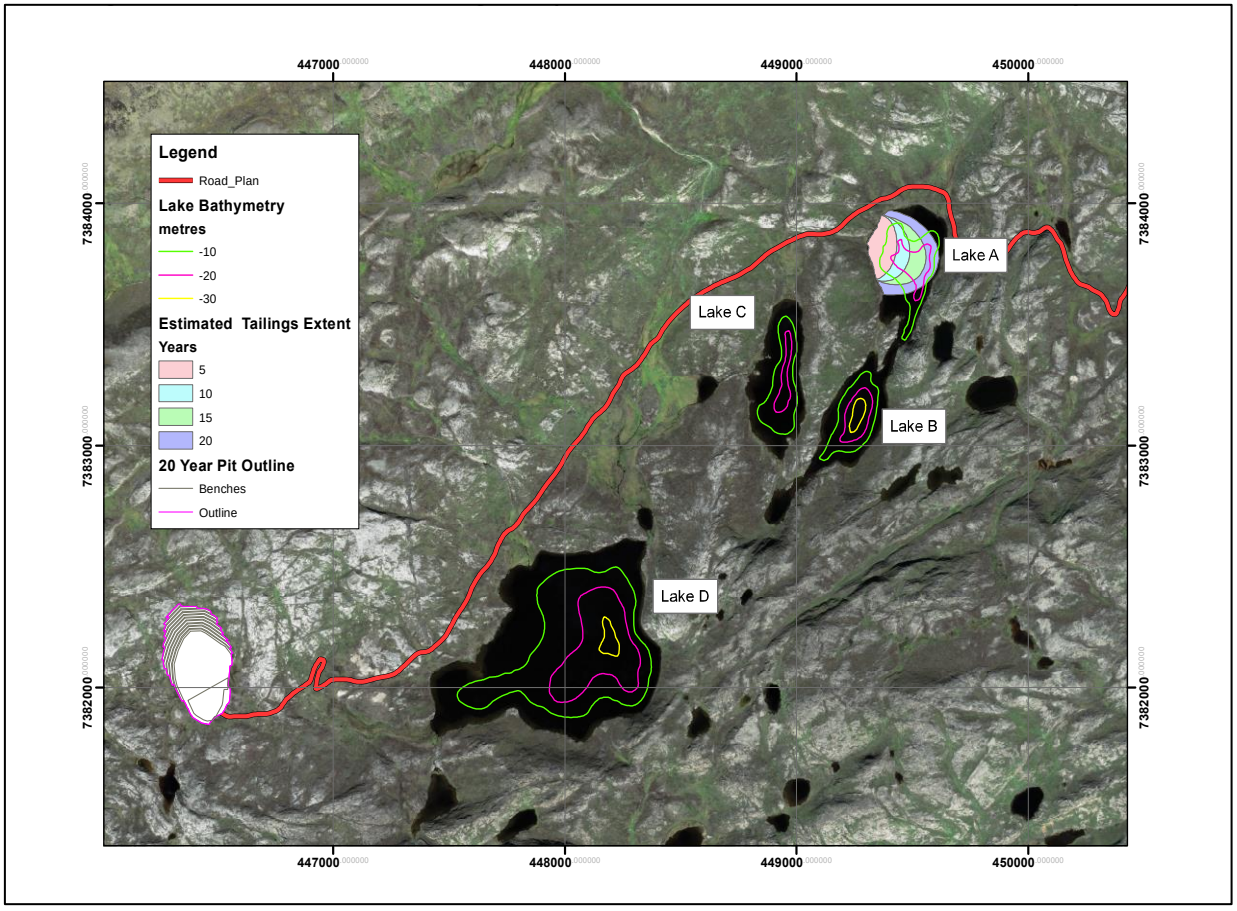


Figure 7: Location of Tailings Pond

Site roads will be located throughout the site to provide access to all operational areas of the mine. All buildings will be designed for a heavy-duty industrial environment, with an expected service life of approximately 20 years. The mine site staff dormitories will be used to accommodate the construction workforce during the construction period.

2.2.7 Power Source

Power for the process plant, truck shop and accommodation buildings will be provided by diesel generators (750KW provided by two 400 KW units). The ship loader has its own internal source of power. A separate 25 KW generator is planned to meet requirements at the quarry.

Sufficient fuel storage is planned to meet the requirements of all power units for at least two months. Fuel will be stored in spill protected double walled tanks equipped with pumps. Fuel supply to the main power unit in the port and camp area will be via dedicated line, while supply for mobile equipment will be via metered pumps. Fuel supply for the generator at the quarry site will be via a self-contained tank which will be refilled as required from a mobile service truck.

2.2.8 Personnel

Approximately 20 people are expected to be involved in the construction phase, which is expected to last approximately six months, starting in the first half of 2015, depending on permitting.

Approximately 30 full time positions are expected to be required at the mine site during operation. After taking into account rotating two shifts, and administrative staff, approximately 61 people are required on a full time basis. The work season for the mining operations will be 9 months but the processing plant will run 10 months per year. Hudson's objective is to have a Greenlandic workforce making up a minimum of 80% of all positions (or 49 employees). It is anticipated that with training and recruitment it could take a minimum of 24 months to achieve this target. Workforce capacity in Greenland will be assessed as part of the SIA.

On site workers will work 12-hour days, seven days per week. The final rotation schedule will be confirmed following further consultation with communities and the Greenland Working Environment Authority.

2.3 Closure and Reclamation

The White Mountain Project is expected to have a mine life beyond 20 years, assuming markets and demand remain strong. At the conclusion of the project, Hudson will implement the following closure plan and project reclamation:

- Reclamation of the mine road and natural drainage and slope reconstruction along the road to allow for natural re-vegetation;
- Reclamation of the port site and covering with overburden, as needed, to allow it to naturally vegetate;
- Removal of all heavy machinery, process buildings and living quarters;
- Removal of all explosives to be inventoried and secured in a protective environment and/or an approved facility by the MLSA;
- Removal of all remaining fuels, oil, grease and any used oil for reuse or disposal at an approved facility;
- Dismantle and removal of all structures; and
- Dismantle and transport all fuel handling infrastructure to an approved facility or for reuse where applicable.
- If the closure team is large enough, a qualified health practitioner will be on site.

2.4 Proposed Project Schedule

Hudson has initiated the application for an exploitation and mining license to the MLSA. If successful, license issuance will be followed by a construction period beginning in the first half of 2016. Operation is expected to commence in the fourth quarter of 2016, or early 2017, and continue for 20+ years. The operation is only limited by the availability and sustainability of international markets to sell the anorthosite material. There are currently sufficient resources defined for at least 120 years of operation. The project design allows for an increase in production of 25-50% if the market demand is there without increasing the mine footprint.

Based on the submission requirements for the exploitation license, a feasibility report has been submitted to the MLSA, along with the EIA and SIA. The Ministry of Industry, Labour and Trade (MILT) is responsible for the SIA process.

2.5 Operations in Greenland

Hudson will produce an anorthosite product on site at the White Mountain project in Greenland. The product will be a low iron, sand-like, material that will be shipped to Hudson's customers. Typical of industrial minerals, different customers will require different specifications for their furnaces. This will likely mean that Hudson may need to "finish" the product to smaller size fractions in some cases.

If a customer determines that a final milling stage is required, Hudson will undertake this closer to its customer. There are several key factors underlying this reasoning, including the following:

- Inability of ships and port facilities to handle fine powders for transportation
- Increased dust generation issues when loading and unloading powders
- Increased project CO2 output in Greenland by over 600%
- Increased operating costs – fine milling is very energy intensive
- End users may find that they don't need a milled product after testing the material

2.5.1 What is Milling?

A ball mill, a type of grinder, is a cylindrical device used in grinding (or mixing) materials like ores, chemicals, ceramic raw materials and paints to produce powders (see Figure 7). Ball mills rotate around a horizontal axis, partially filled with the material to be ground plus the grinding medium, which in Hudson's case would be alumina balls. An internal cascading effect reduces the material to a fine powder.

2.5.2 Is Milling Necessary?

The E-Glass industry currently uses kaolin as the source of aluminum in the fiberglass. Kaolin is naturally a very fine material. Therefore, customers are used to using a fine material in their fiberglass production even though it is difficult to handle and mix in comparison to the other

materials added to the batch. Hudson expects that potential customers will be able to use the product shipped directly from Greenland but some may need to start by using a finer milled material before they become comfortable using the coarser product. Therefore, using an existing tolling facility, whether in Europe, North America, or Asia, is likely the best option for supplying the needs of the customer in the short term. As a base-case for the feasibility study (to determine the minimum economic viability of the project), Hudson has assumed building and operating a mill in the Netherlands.



Figure 8 - Example of Ball Mill in operation in Europe processing similar material to Hudson's anorthosite. Hudson would require two mills this size. Note the fine powder accumulation on the floor

2.5.3 Power Requirements

The milling operation requires a great deal of power to turn the mills and reduce the rock to a powder. This amount of power is not available locally and would have to be produced on site using diesel generators. This will increase the carbon footprint of the project by 633% with an additional 377,940 tonnes of CO_2 produced over a 20 year mine life.

- Power requirements without milling: 750 kW

- Power requirements with milling: 4,750 kW
- Additional power requirements with milling: 21,459,000 kW hours
- Additional CO2 production from milling in Greenland: 18,897 tonnes per year



Figure 9 - Example of Milled Product Open Storage

2.5.4 Material Handling and Shipping

When it comes to shipping out the product from Greenland, it is important that it be accomplished as efficiently as possible and with minimal environmental impact. Hudson plans to produce the finest, directly marketable product that it can in Greenland. Hudson has determined that the sand-like properties of the magnetically separated finished product provides the optimal product for bulk shipping.

Hudson considered packaging the product in bulk bags for shipping, however, after discussions with numerous logistics and shipping companies it was determined that that ships could not be loaded to anywhere near capacity, loading and unloading times would be much

longer and port facilities would require higher capital investment for specialized material handling equipment. All of these greatly increase per tonne shipping costs and overall operating costs making the project less competitive.

When it comes to shipping powders, one of the more serious concerns is the potential for liquefaction of the cargo while shipping. Fine powders may liquefy if shipped at moisture content in excess of its transportable moisture limit (TML). This can cause the load to shift in the ship hold, with potentially catastrophic consequences.

As well, as the ore is reduced in size, the issue of dust generation increases. Hudson is fortunate that the anorthosite does not produce any harmful amounts of free silica (<1%), which is deemed a hazardous material. However, excessive dust is still a health and environment risk. Figure 8 illustrates an example of open storage of a fine milled product. Considerable dust is present, resulting in a health hazard to workers. It is best to limit this potential risk to the last possible step before shipping to the client by train, truck or bulk bag.

Hudson personnel have toured port facilities in Europe and been made aware of the restrictions and/or excessive fines if there is excessive dust creation when offloading fine powders. This will make it very difficult, if not impossible, for Hudson to find a port willing to receive a milled material.

2.5.5 Project Economics

White Mountain is an industrial mineral project with relatively low margins compared to metal projects, and as such it is very sensitive to any increases in operating costs. Aside from the environmental and shipping constraints, producing a finely milled material in Greenland would significantly increase the operating costs and would reduce the competitiveness of the project.

Milling would increase the power needs of the project from 750 kW to 4,750 kW. Milling costs in Greenland would be almost three times higher than in Europe and six times higher than the US due to power costs. The cost to generate diesel power on site is 30 cents per kW versus 5 cents in the US and 8 eurocents in the Netherlands.

The milling operation requires a limited number of people to operate it (4 or less), and as such, it would create a maximum of four new positions in Greenland. From a pollution context, this is equivalent to producing 95,000 tonnes of CO_2 per additional job created if milling is done in Greenland.

Whether or not milling occurs in Greenland, there will still need to be a storage and transfer facility in Europe and/or the US and Asia. This is because there always needs to be a source of material ready for shipping to the end user as their furnaces cannot be shut down, and Hudson must mitigate the risk of the potential for shipping disruptions from Greenland due to weather and ice conditions.

2.6 Mitigation and Enhancement Measures Inherent in Project Design

Environmental design features include project design elements, environmental good practices, and management policies and procedures. Environmental design features (including those related to the social environment) were developed through an iterative process between the Project's engineering and environmental and social scientists to avoid or mitigate negative effects and to enhance positive benefits. Environmental design features and general mitigation for the Project bulleted below:

Employment

- The target is at least 50 percent of construction phase employees will be Greenlandic;
- Over time, at least 80 percent of operation phase employees will be Greenlandic; and,
- Contractor selection will include the number of Greenlandic employees proposed to be hired, and terms of their employment.

Local Procurement

- The Project will purchase traditional foods from local hunters and fisher people from local communities and at the Hudson port facility where a phone will be installed at the dock to contact the camp coordinator.

Employment Incomes

- The Project will ensure that wages for various skills and work experience are in line with Greenlandic wage rates; and

Workforce Skills Development

- The Project will begin training programs 6 months prior to the beginning of mining operations.

National and Local Education

- The Project will engage with educational institutions to develop curriculum and skillsets that will be required for work with the Project.

Physical Infrastructure

- The Project will meet or exceed Greenlandic air quality thresholds;
- The Project will incinerate, bury or compost organic refuse according to local regulations;
- The Project will transport other waste that cannot be incinerated to the nearest town for disposal (Sisimiut), where additional capacity exists; and
- The Project will treat wastewater through two self-contained, small-scale sewage systems, installed for use at the Project site.

Social Infrastructure

- The Project will construct a permanent, fully-catered camp to house employees;
- The Project will establish designated pick up spots to transport workers from their home communities to the Project site for work rotations to limit people relocating to communities near the Project site;
- The Project will have on-site first aid facilities to deal with minor injuries and illnesses;
- The Project will prohibit drug and alcohol use (zero tolerance policy) amongst staff at the Project site and during transport to and from the Project site; and
- The Project's port facility will have an emergency shelter and communications for fishermen to use.

Community Well-being

- For mine workers, the Project will have work rotations which are yet to be determined ;
- For plant processing workers, the Project will have work rotations which are yet to be determined;
- The Project will implement a life skills training to support the transition into mining careers.

Physical and Mental Health

- The Project will incorporate Greenlandic traditional foods into the catering menu for local employees; and
- The Project will have a zero tolerance policy for drugs and alcohol in the workplace, camp accommodations and during transport to and from rotations in all phases of the Project.

Occupational Health and Risk of Accidents

- The Project will develop a Health, Safety and Environment Policy with related standard operating practices;
- The Project will have Health and Safety Training for all project employees in Greenlandic, Danish and English languages to ensure proper comprehension;
- The Project will regularly inspect and maintain all Project infrastructure and vehicles;
- The Project will deliver driver training and establish a code of conduct to control speeds and encourage safe driving;
- The Project will secure all facilities with potential to pose worker and public health and safety risks, including prevention of public access, including the Project road, and other facilities where necessary;

- The Project will avoid and minimize any environmental effects that have the potential to affect public health, including those that may negatively affect livelihood resources; and,
- The Project will deliver public information and education programs on Project environmental effects and risks to contribute to people's i) understanding of mining activities; ii) perceptions of harm and iii) emergency preparedness.

Perceptions of Harm

- The Project will engage in ongoing consultations and public information and education events on anorthosite mining and its risks to people and the environment.

Cultural Heritage (Archaeology)

- The Project will establish a Chance Finds Procedure to protect archaeological cultural heritage; and,
- The Project will develop and implement a Cultural Heritage Management Plan.

Effects to Hunting and Fishing

- The Project will restrict access to the Project road for LSA residents for safety reasons; and,
- The Project will prohibit pick-up of unauthorised people in Project vehicles.

Nature and Landscapes

- The Project will develop a closure and reclamation plan that addresses how nature and landscapes will be reclaimed for the Project.

Social Impact Assessment Objectives

The objective for the Social Impact Assessment (SIA) is to assess the effects of the Project on existing social conditions of towns and settlements in the local study area (LSA).

2.7 SIA and Permitting Activities

The main activities required for an application of an exploitation license are as follows:

- Community consultations (completed)
- Preparation of the SIA (draft completed)
- Preparation of an EIA (draft completed)
- Submission of a project feasibility study (completed)
- Translation of the Executive Summary of the EIA and the Executive summary of the SIA to Danish and Greenlandic (following government approval) and made available to the public (completed)
- Public hearings (8 weeks long), which was conducted in the first half of 2015
- Preparation of White Paper based on public hearing comments (completed)
- Preparation of a draft Benefit and Impact Plan as the foundation for negotiating the Impact Benefit Agreement
- Negotiation of an Impact Benefit Agreement (IBA).

Community consultations are one of the key activities required for the SIA process. A systematic approach was used to identify stakeholders based on the likely geographic extent of the project's influence. This includes the primary areas of activity and potential communities and their likely interactions with project activities, including transport routes. Stakeholders that were interviewed include the following:

- MLSA;
- Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat (KNAPK);
- Kalaallit Nunaanni Kommuneqarfiit Kattuffiat (KANUKOKA);
- Mittarfeqarfiit;
- Air Greenland;
- Royal Arctic Line;
- Agency for Health & Prevention;
- Grønlands Erhverv (GE);
- Sulinermik Inuussutissarsiuteqartut Kattuffiat (SIK);
- Nunaqavissut Suliffiutillit Kattuffiat (NUSUKA);
- Greenland Institute for Natural Resources;
- Inuit Circumpolar Council (ICC);

- Nature and Environment Association of Greenland (AVATAQ);
- Greenland National Museum;
- Qeqqata Municipal Council;
- Police;
- Port Authorities;
- Greenland School for Minerals and Petroleum;
- Qeqqata Business Council;
- Hunters, Fisherman & Outfitters;
- Sisimiut Hospital;
- Piareersarfik;
- Artek;
- Town and Settlement Councils;
- Airport Authorities;
- Local businesses; and
- World of Greenland Arctic Circle.

Two stakeholder tours were undertaken in June 2012 and November 2013 respectively. For the first stakeholder tour, all communities in Qeqqata Municipality were visited and focus group meetings with stakeholders were held. The following focus group meetings took place during the first stakeholder tour between June 14 and 26, 2012:

- Kangerlussuaq Settlement Council;
- Kangerlussuaq Hunters and Fishers;
- Air Greenland;
- Qeqqata Municipal Council;
- Sisimiut Hunters and Fishers;
- Sarfannguit Settlement Council;
- Itilleq Settlement Council;
- Itilleq Hunters and Fishers;
- Sisimiut Business Council;
- Qeqqata Municipal Police;
- Greenland School of Minerals and Petroleum;

- Kangaamiut Settlement Council and Hunters and Fishers;
- Maniitsoq Town Council;
- Maniitsoq Port/Royal Arctic;
- Maniitsoq Hunters and Fishers;
- Napasoq Settlement Council and Hunters and Fishers;
- Atammik Settlement Council and Hunters and Fishers;
- Ministry of Health;
- NUSUKA;
- Greenland Institute of Natural Resources (GINR);
- KANUKOKA;
- MLSA;
- Employers Association of Greenland (GA);
- SIK;
- ICC;
- KNAPK; and
- Museum of Greenland.

Generally, these meetings began with an overview of the Project and then information was collected from participants about how White Mountain and the area of the Project footprint was used by communities for hunting, fishing and recreation. Participants were then invited to raise other issues or concerns that should be addressed in the SIA, EIA or through project planning.

For the second stakeholder tour, a mix of focus group meetings and public meetings were held in the following communities between November 4 and 7, 2013:

- Kangerlussuaq;
- Sarfannquit;
- Sisimiut;
- Kangaamiut;
- Maniitsoq;
- Atammik; and
- Nuuk.

At these meetings presentations were given and feedback was sought from participants on

issues related to the Project.

Community consultations and activities involving stakeholders are expected to continue throughout the lifetime of the project.

3.0 ASSESSMENT APPROACH

3.1 Policy, Legal and Administrative Framework

Under the *Act on Greenland Self Government,* the Government of Greenland has administrative control of the environment, including mineral resources (Government of Greenland, 2009a). Mining activities are regulated by the *Mining Resources Act* (Government of Greenland, 2009b), which stipulates the requirements for how activities are carried out throughout the Project life cycle, including employment and contracts. The *Mining Resources Act* was amended in 2012 (Government of Greenland, 2012a) and again in 2014 The Mineral License and Safety Authority (formerly the Bureau of Minerals and Petroleum (BMP)), the Ministry of Mineral Resource; the Ministry of Industry, Labour and Trade; and the Ministry of Environment have administrative authority for mineral activity. Under the *Mineral Resources Act*, the following activities currently require a license from the Government of Greenland:

- Prospecting, exploration and exploitation of mineral resources and export of mineral resources from Greenland;
- Use of the subsoil for storage or purposes relating to mineral resource activities;
- Use of energy from water, wind or the subsoil for activities under the Greenland Parliament Act; and
- Establishment and operation of pipelines for activities under the Greenland Parliament Act.

Under the *Mining Resources Act*, the Government of Greenland collects revenues from the following mineral resource activities:

- Licensing fee from prospecting, exploration, or exploitation of mineral resources;
- Taxation of licence holders for revenue related to mineral resources in Greenland;
- Collecting revenue from Greenland and Danish public authorities' stakes in companies; and
- Collecting revenue from withholding tax.

Other national legislation and guidelines which are applicable to mining activities include:

- The Greenland Working Environment Act no. 1048 (2005);
- Greenland Conservation Act (2007);
- Guidelines for Social Impact Assessments for mining projects in Greenland (2009);
- Standard Terms for Exploration Licenses for Minerals (excluding hydrocarbons) in Greenland (2009);

- Guidelines for Preparing and Environmental Impact Assessment (EIA) Report for Mineral Exploitation in Greenland (2011); and
- Standard Terms for prospecting Licenses for Minerals (excluding hydrocarbons) in Greenland (2010).

Due to the formation of a new government in Greenland a new structure related to the administration of mineral resources was put in place. As mentioned above, the following authorities are responsible for the administration of the mineral resource area:

1) Ministry of Mineral Resources
2) Ministry of Industry, Labour and Trade
3) Ministry of Nature, Environment and Justice

The Ministry of Mineral Resources and the underlying Mineral Licence and Safety Authority are responsible for the licence administration, technical and geological matters. The Ministry of Industry, Labour and Trade is the authority for issues concerning Industry and Labour policy including social impact assessments (SIA) and Impact Benefit Agreements (IBA) for mineral resource companies and similar related socio economic matters. The Environment Agency for mineral resource activities is responsible for all mineral resource environmental issues including Environmental Impact Assessments (EIA).

3.2 Methodology

The methods for the SIA are broadly similar, but differ from other biophysical studies assessed in the Environmental Impact Assessment. The steps for this assessment are summarised as follows:

- Identify key questions for the assessment;
- Select assessment indicators;
- Describe temporal, spatial, administrative and technical boundaries;
- Describe likely effects of the Project on the assessment indicators;
- Propose mitigation and social management measures to reduce or eliminate adverse effects, or to enhance benefits; and
- Classify residual social effects (i.e., after mitigation and benefit enhancement measures are applied).

3.2.1 Key Questions

Key questions provide focus to an assessment and identify the primary questions this study must answer. The questions are developed from consideration of key issues, which are drawn from the following sources:

- The results of Environmental and Social Impact Assessment consultation;
- The requirements of the relevant legislation and study guidelines, particularly Mineral License and Safety Authority Social Impact Assessment Guidelines; and,
- The professional expertise of the SIA team.

Key issues arising from the consultation were:

- Concerns about cultural and environmental impacts of road developments;
- Potential effects on hunting and fishing, both commercially and for subsistence;
- Potential effects on local animals (specifically caribou);
- The hiring of local workforces and the mine related training that would be required;
- Use of local suppliers;
- How mine waste will be stored;
- Noise from blasting activities; and
- Potential environmental risks.

3.2.2 Assessment Indicators

Assessment indicators are used to assess potential impacts to the social environment[1]. These typically include aspects that may affect people's well-being and quality of life either positively or negatively.

Assessment indicators for the SIA were based on:

- Community concerns – identified during SIA consultation;
- The findings of the social baseline conditions;
- The Draft Terms of Reference submitted to the Mineral License Safety Authority (2013);
- The Mineral Licence and Safety Authority Social Impact Assessment Guidelines; and
- The professional expertise and experience of the SIA team.

[1] Assessment indicators are not measurable, but represent topic areas that will be assessed within the SIA.

The social assessment indicators, according to the categories of the social assessment, are presented in Table 1.

Table 1: Social Indicators

Social Category	Assessment Indicator
Economic Effects	■ Employment Local Procurement ■ Economic Growth and Diversification ■ Employment Incomes ■ Taxation Effects
Education and Training	■ Workforce Skills Development ■ National and Local Education
Public Infrastructure, Services and Economic Development	■ Physical Infrastructure ■ Social Infrastructure ■ Pressure on Planned Developments
Social and Health Effects	■ Demographics and Population ■ Change Land Acquisition and Displacement ■ Community Well-being ■ Physical and Mental Health ■ Environmental Impact ■ Occupational Health and Risk of Accidents ■ Perceptions of Harm
Cultural and Natural values	■ Cultural Heritage (Archaeology) ■ Recreational Land and Resource Use ■ Land and Resource Use for Livelihoods ■ Nature and Landscapes

3.2.3 Temporal, Spatial and Administrative Boundaries

3.2.3.1 Temporal Boundaries

The temporal boundaries of the assessment have been defined based on the proposed Project schedule and are described in Table 2.

Table 2: Temporal Boundaries

Project Phase	Timeline
Construction	2016
Operation	2016/2017 – 2036 (20+ years)
Closure	2036 (potentially longer)

In some cases it is not practical to differentiate between phases when Project effects span more than one phase, or when Project effects are bounded by effects during one phase. For each indicator, professional judgement is used to best describe the effect in relation to Project phases.

3.2.3.2 Spatial and Administrative Boundaries

The spatial and administrative boundaries of this assessment are defined by the legislative requirements and any other international guidelines that will be adhered to by Hudson. The MLSA Guidelines require that a SIA includes information for Greenland as a whole (BMP 2009). Consequently, this SIA defines the Regional Study Area (RSA) as the country of Greenland. The MLSA Guidelines also stipulate that a SIA includes information about potentially affected local communities. For the SIA, all communities in Qeqqata Municipality have been identified as the LSA. Although not located within Qeqqata Municipality, the Capital of Greenland, Nuuk, is also considered to have the potential to be affected by the mining activities, and is included in the LSA. The inclusion of Nuuk is due to its high concentration of infrastructure, institutions, workforce and businesses and so it is expected to benefit by the Project through increased employment and procurement opportunities. Nuuk is located in Sermersooq Municipality. A list of all LSA towns and settlements can be found in Table 3.

All eight towns and settlements in Qeqqata Municipality are considered to have the potential to be affected by activities related to the mining activities. The towns of Sisimiut, Maniitsoq and Kangerlussuaq are considered to have greater potential to be affected by the Project than smaller settlements due to potential benefits from Project employment, local procurement opportunities and the Project's use of local transportation infrastructure (i.e., in Kangerlussuaq). People in the settlements rely on the land for hunting and harvesting animals and plants, and the sea for fishing and (some) harvesting of marine mammals for subsistence in the summer. The Project's potential effects on land and marine resources and their habitats could result in changes in both patterns and success of harvesting and fishing. Changes in harvesting activity can have effects on the maintenance of culture and identity as well as on diet, health and food security. Consequently, all settlements in Qeqqata Municipality are considered to be a part of the LSA as they have the potential to experience some level and type of change due to the Project.

Table 3: Local Study Area Communities

Municipality	Communities
Qeqqata	
Towns	Sisimiut , Maniitsoq and Kangerlussuaq
Settlements	Itilleq, Sarfannguit, Kangaamiut, Atammik and Napasoq
Sermersooq	Nuuk (town)

Data for some communities is captured at the district level. Districts refer to a geographical boundary around towns, which include both the town (which districts are named after) as well as nearest settlements. All settlements belong to a district.

3.2.4 Likely Effects

Likely effects of the Project on the assessment indicators are described. The description of the Project that is assessed is provided in the Project Description Report. The assessment of effects assumes the social and environmental management measures included in the Project Description Report and identified in the environmental impact assessments, are applied.

3.2.5 Mitigation and Social Management Measures

Mitigation and social management measures, beyond those described in the Project Description or in the Environmental Impact Assessment (EIA), are proposed herein to reduce or eliminate adverse effects, and enhance beneficial effects of the Project. Mitigation and social management measures are outlined in detail within the discussion of each assessment indicator or social feature. They are also summarised in Table10 Impact Assessment Summary.

3.2.6 Classification of Residual Effects

The criteria for classifying residual social effects are broadly comparable to those used for biophysical effects. There are, however, some differences in the choice and/or the definition of criteria.

- **Direction** indicates whether an effect is considered positive (a benefit) or negative. Social effects are not neutral, although some effects may have both positive and negative dimensions (or positive for some people and negative for others) and some potentially negative effects may become positive with the implementation of social management measures.
- **Magnitude** refers to the degree of change in a social feature that an effect has the potential to produce. Magnitude may be negligible, low, medium, or high and is usually (but not always) qualitatively assigned. Negligible indicates no discernible effect. Low magnitude indicates a discernible effect on a social feature but the effect is not expected to materially affect or change any aspect relating to the daily lives of the people. Medium magnitude indicates a noticeable and potentially detrimental or beneficial change. High magnitude indicates that the effect is expected to substantially change or enhance aspects relating to the daily lives of at least some individuals, families or communities.
- **Geographic extent** relates to most social effects and is considered in terms of administrative units. Local effects are experienced by the people closest to a proposed Project. For most social components of this assessment, this is defined as the towns and settlements in the Qeqqata Municipality and the city of Nuuk. Local effects will be experienced by at least one or more of these communities. National level effects are experienced at the level of the Nation and are most-often macroeconomic in nature. As

well, some effects are experienced by some, but not other, individuals within an assessment area, and may not have community level manifestations. Any potential for particularly negative effects on some individuals needs to be identified and addressed so these are noted. As no people are resident at the Project site, there is no Project footprint assessment area.

- **Duration** refers to the length of time over which an effect occurs. In this case short refers to the construction period (approximately 6 months), medium refers to a duration beyond construction and up to five years. Effects that are expected to persist for longer than five years are considered to be of long duration. It is noted that these durations are not linked to the Project – for example, a social effect that persists for the Project's operations phase would have to be considered long term in terms of people's experience of that effect.

Most social effects are not considered to be reversible (unlike many physical and biological effects) and trend towards being long term. Social effects are part of an ongoing process of interdependent economic and social change extending into the future and generally cannot be reversed to return to one or all of pre-Project development conditions. In this sense, most social effects are cumulative, as they are products not only of a given project but of the interaction of that project and its effects with the broader, continuously evolving, economic and social environment. For example, although most employment will come to an end at final closure, job experience and training will have enhanced the capacity of individuals to find other employment, with lifelong implications – the employment effect will not be fully reversed. Further, since it is presumed that a project is only permitted if it is expected to bring net economic and/or social benefit, a return to pre-project social conditions may not in fact be desirable. Thus the reversibility criterion is only used, by exception, where an effect can be considered to be fully reversible. Also, although there are isolated exceptions, most social effects are experienced continuously. Thus frequency is not often a useful criterion for social assessment. Where frequency is relevant to the assessment of a specific effect, this is noted in the discussion of that effect, again by exception. Similarly, assigning likelihood can be problematical for social effects. With some exceptions, most social effects are considered highly likely (almost certainly) to affect at least some individuals even where community level effects may not be observable. In the event that an effect is considered likely, but with less certainty, this is noted in the assessment, again by exception.

Social impact assessment criteria for the Social Impact Assessment are defined in Table 4.

Table 4: Social Impact Assessment Criteria

Direction	
Positive	Effect is beneficial
Negative	Effect is adverse

Table 4: Social Impact Assessment Criteria

Magnitude: Negative impacts	
Negligible (N)	The impact has no effect on existing social conditions
Low (L)	The impact has an effect, but does not materially result in any changes to existing social conditions
Medium (M)	The impact has a moderate effect, is noticeable and potentially detrimental to existing social conditions
High (H)	The impact is severe and will substantially interfere with people's lives or have a detrimental effect to existing social conditions
Magnitude: Positive impacts	
Negligible (N)	The impact has no effect on existing social conditions
Low (L)	The impact has an effect, but does not materially result in any positive benefit to existing social conditions
Medium (M)	The impact has a moderate effect, is noticeable and potentially beneficial to livelihoods and existing social conditions
High (H)	The impact provides a substantial benefit to livelihoods and social conditions
Duration	
Short term	Length of construction (6 months)
Medium term	1-5 years
Long term	Beyond five years
Extent	
Local	The impact will affect one or more of the LSA communities identified the Social Impact Assessment Report
National	The impact will affect Greenland
Classification of Residual Effect	
Negligible (N)	The impact will have no effect on existing social conditions
Low (L)	The impact is minor, the affected persons will sustain the change with minimal interruption/ adjustments to existing social conditions
Medium (M)	Negative – the impact is not expected to breach acceptable limits for sustainable development, but intervention (mitigation) is required to maintain the effects or minimise its level Or Positive – the impact is expected to result in perceptible minor to moderate benefits to some people.

Table 4: Social Impact Assessment Criteria

High (H)	Negative – the impact exceeds accepted parameters for sustainable development Or Positive – the benefits accrue to large sections of the economy and population, with substantial opportunities for participation in benefits

3.3 Summary of Existing Conditions

Existing conditions for the RSA and LSA were assessed by Hudson's consultants, Inuplan and Golder, and covered the existing social environment in Greenland, Qeqqata Municipality and Nuuk. The process of data collection and reporting included the following steps:

- Screening and identification of key issues relevant for the proposed Project components;
- Literature review and secondary data collection (published data);
- Consultation with select stakeholders and data collection tour; and
- Data entry, analysis and reporting.

The following sections provide a summary of the existing conditions.

3.3.1 Economy

The economy of Greenland is in the process of diversifying, and the extractive resource industries (i.e., mining, oil and gas) are an important part of Greenland's economic development strategy. Public administration, however, is currently the largest employment sector. Commercial fishing and tourism industries are also considered important to the national economy. Fishing is particularly important in LSA communities.

Inflation in Greenland is high: the Consumer Price Index has continued to increase since 2008. Between 2008 and 2013, construction costs rose by 9% in Greenland, for example.

3.3.2 Education and Training

The main institution of higher learning in Greenland is the University of Greenland and is located in Nuuk. The Greenland School of Minerals and Petroleum is located in Sisimiut. Improvements in education and training are necessary for Greenland to respond to potential opportunities in the oil, gas and minerals sector. The Greenland Education Programme (2005) provides the basis for reform in the education and vocational training sectors, with the objective of contributing to a self-sustaining economy with a well-educated workforce. In Qeqqata Municipality, 23% of the population has a primary level education or lower, 72% has completed a secondary or tertiary level of education (including vocational education), while only 5% of the population has obtained an academic degree.

3.3.3 Public Services and Economic Development

Public services and infrastructure are largely managed by government owned companies, including

- **Royal Arctic Line (RAL)**: operates harbours and shipping lines;
- **Air Greenland**: provides transportation services for goods and people by plane and helicopter;
- **TELE Greenland**: provides telecommunications, information technology (IT) and postal services;
- **Aasiaat Radio**: Coastal radio service provided by TELE Greenland, including monitoring of international emergencies at sea, meteorological updates, navigational warnings, and distress calls;
- **Polaroil**: supplies fuel, arctic grade gasoil, diesel, petrol, gasoline, kerosene and Jet A-1 to most towns and settlements;and
- **Boligselskabet INI A/S**: manages state-owed public housing.

Solid waste, sanitation, and potable water are provided locally by the municipalities. The closest international airport to the Project is located in Kangerlussuaq. As there are no roads connecting towns and settlements, local transportation methods are limited to plane, helicopter or boat. All towns in the LSA are coastal and therefore rely on harbours for transportation of goods and people. The Nuuk harbour is the largest, and serves as the main harbour in Greenland, while Maniitsoq harbour is closest to the Project.

The national hospital is located in Nuuk and the Qeqqata regional hospital is located in Sisimiut. Within the LSA, settlements have limited access to local medical services and must travel to nearby towns for serious conditions.

3.3.4 Social and Health

The population of Greenland is relatively small (56,370 in 2013), yet has remained stable over the past decade. The population has a low density, only 0.14 people per square kilometer of ice-free land. Sixty-three percent of the population lives in the six largest towns in Greenland: Nuuk, Sisimiut, Ilulissat, Qaqortoq, Maniitsoq and Aasiaat.

Over the past 60 years, there has been a shift from traditional to a “western” lifestyle in Greenland. As participation in traditional activities declines, the population is at higher risk of chronic diseases, including diabetes, cardiovascular diseases and certain cancers. The traditional diet of fish and marine mammals has been replaced to a certain extent by imported foods. Physically demanding subsistence activities, such as hunting and fishing, have been replaced by sedentary income-based employment. Physical activity has also declined due to the motorization of transportation. Overweightness and obesity are more prevalent, and one in ten adults has diabetes. Communicable diseases, including sexually transmitted diseases

(STDs) and tuberculosis have increased over the past five to ten years. The rate of human immunodeficiency virus (HIV) is, however, relatively low.

The Greenlandic population demonstrates higher levels of substance abuse that other Nordic countries, including higher consumptions levels of alcohol and cigarettes. However, over the past decade the import of both cigarettes and alcohol has declined suggesting that consumption levels are decreasing. Police have identified a link between substance abuse and violent crimes, including sexual abuse. According to the Police, these types of crimes are the greatest challenges faced by law enforcement.

3.3.5 Cultural and Natural Values

Greenlandic (*Kalaallisut*) is the official language of Greenland. The White Mountain (Naajat) site is traditionally referred to as "*Qaqortorsuup Kangilia."* Although Greenlanders no longer rely solely on hunting and fishing for food, these traditions remain an integral part of the culture. Traditional land use practices are especially important in North and East Greenland. Within the LSA, the primary species harvested by both recreational and commercial hunters are muskox and caribou. Important fish species include cod, lump fish, wolfish, flounder, salmon and char. Additional land uses in include berry picking and plant collection, soapstone collection, and hiking.

There are several protected and ecologically sensitive areas located within the LSA. The Paradise Valley (*Arnangarnup Qoorua*) is unique and valued as a cultural landscape, with archaeological evidence of hunting and fishing activities dating back to 2150 BC. Robinson Bay (*Angujartorfik*), located across the Kangerlussuaq Fjord from the Project, is also an important cultural area that is used as a remote wilderness area. Robinson Bay is also in proximity to a caribou calving area, and a protected archaeological area. There is a protected area in the vicinity of the Kangerlussuaq International Airport and the road to the Ice Cap where hunting is prohibited. There are two Eider colonies, one along the Kangerlussuaq fjord north of the Project, and one along the Itilleq Fjord, each of which is surrounded by a 200-metre protective zone. There is a geese resting area along the Itilleq Fjord, which is used during migration. There are also several bird colonies and an Important Bird Area inland from the settlement of Kangaamiut.

3.4 Summary of Stakeholder Engagement Results

Overall, people in the LSA indicate that there is a need for local employment, and understand that employment through the mining industry may address this demand and provide higher living standards.

Generally, people in the LSA identified the following concerns about the Project[2]:

- Potential cultural and environmental impacts;

[2] Focus group meetings and public meetings with stakeholders were held in Qeggata Municipality in June 2012 and November 2013.

- Potential effects on hunting and fishing, both commercially and for subsistence;
- The hiring of local workforces and the related training that would be required;
- Use of local suppliers;
- How mine waste will be stored;
- Noise from blasting activities;
- Local hiring policy, number of jobs and training opportunities;
- Environmental risks; and
- Potential effects on local animals (specifically reindeer).

4.0 IMPACT ASSESSMENT

4.1 Economic Effects

The Project will have effects on the economy of the Qeqqata Municipality and Greenland, through local and national expenditures, job creation and revenues to the national and municipal governments. This section explains and discusses some of the potential economic effects.

The economic effects that will be assessed are:

- Direct Employment;
- Local Procurement;
- Economic Growth and Diversification;
- Employment Incomes; and
- Taxation Effects

4.1.1 Employment

Key Question: What effect will the Project have on Employment (direct, indirect and induced) in the LSA and Greenland?

The employment rate in Greenland was 71.6% in 2011. Unemployment rates are on the rise throughout Greenland and the Qeqqata Municipality, indicated by a larger proportion of the population receiving public aid, such as unemployment benefits. The national unemployment rate is estimated at 9.4% (Statistics Greenland, 2013a) while in the Qeqqata Municipality the unemployment rate is estimated to be 7.7% in Maniitsoq and 5.5% in Sisimiut (Statistics

Greenland 2012a), the two largest towns in the LSA. In 2011, there were approximately 2,100 people with fulltime employment in the construction industry, 3000 people in the transportation sector, and 4,900 in the other sector category[3], which includes the mining and resource industries. In total, this amounted to about 35% of the total Greenlandic labour force (Statistics Greenland, 2013a).

There are several education and training institutes related to the construction and mining industry in Greenland. Some of the largest educational institutes related to these industries are located in the LSA in the town of Sisimiut. They are: the Building and Construction School, Greenland School of Mineral and Petroleum, the Greenland Technical College, and the Centre for Arctic Technology. Programs offered include: arctic engineering, planning and the environment, mining and construction courses. The Mining School in Sisimiut also recognizes that the main language of mining is English and therefore curriculum is taught in English to ensure that students are work ready for industry expectations.

There are some concerns that there may not be enough qualified labour available to fill all positions available by the Project. Although the unemployment rate is rising in Greenland, and Greenland will benefit from the Project's employment opportunities, it is more likely that the Project will attract workers who are already employed in mining or in related sectors, including former workers form the Seqi olivine mine, or those who may be underemployed in a related sector. This may indirectly create new job opportunities for the unemployed in the economy.

Hunters may also qualify for some unskilled and semi-skilled positions with the Project. One of the barriers to employing commercial hunters is that if income from employment at the Project accounts for more than 50% of their annual income, they would forfeit their commercial hunting licenses. This is a disincentive for many hunters to pursue opportunities with the Project, particularly short term opportunities such as those available during the construction phase.

Construction Phase

Hudson's will hire a construction firm to build all Project components. They will ensure that their construction contractors use local labour as much as possible in consideration of availability and skills in the local labour force. Hudson will work closely with the Qeqqata Municipality to identify potential employees for the project. It is expected that labour may also come from the capital Nuuk and other regions of Greenland. The estimated total construction workforce is 20 people. The goal is to hire at least half of the construction workforce (10 people) from Greenland during the 6 month construction phase. It is expected that some construction jobs will last the full construction phase. At this time, there is no

[3] The other sectors category includes mining and resource industries, but as information is not disaggregated, it also includes unrelated sectors. No information is provided on the proportion of mining and resource related positions within this category.

breakdown of employment by skill level (i.e., unskilled, semi-skilled, skilled and management) available for the construction period.

A hiring strategy will be put into place and communicated to the Piareersarfiit (employment centres) which are managed by the Municipalities. These centres provide guidance and support to people who are considering educational and/or employment opportunities. They also offer continuing education and job readiness courses such as English language training. The hiring strategy will also be communicated to educational institutions and guidance councillors who can provide this information to students enrolled in relevant courses.

Operation Phase

During the operations phase, the total direct workforce requirement for the Project is estimated to be 61 people, including 51 Hudson employees and 12 contract staff. Approximately 80% of the total workforce (or 49 workers) employed are expected to be Greenlandic. While it may take several years to reach 80% Greenlandic employment, Hudson's is committed to working with the Qeqqata municipality and local training institutions to reach this target for employing Greenlandic nationals. Employment during the operations phase will include positions at the processing plant, the mine site, the accommodation complex, as well as administrative positions which are discussed in greater detail below.

Some information is known about the type of employment that will be available at the processing plant in Greenland. It is projected that there will be 21 positions (or 10 full-time equivalents (FTEs)) working at the plant. The facility is scheduled to run 24 hours per day, seven days per week for ten months (300 days) for the 20+ year life of operations. There will be two 12 hour shifts per day and staff will work on a rotation to be finalized following community and government authority discussions. Table 5 presents estimates of the types and number of positions at the processing plant:

Table 5: Estimated Number of Processing Plant Employees, Operation Phase

Position	Employees
Control Room Operator	3
Millwright	3
Millwright Assist.	3
Electrician	3
General labourers	6
QA/QC & OH&S	3
Total	**21**

It is estimated that approximately 22 people will be employed to work at the mine site. Mine employees will work on a rotational schedule to be determined. The mine site will operate on a nine month (270 day) basis, with one 12-hour shift per day, 7 days per week. As the mine will operate on day shift only, two crews will be required. Most of the mine site positions will be for semi-skilled and skilled employees. Hudson's will put in place workforce education and training programs to support skills improvement and a career path for employees to advance their careers, over time through training and apprenticeship programs. Table 6 presents estimates of the types and numbers of positions at the mine site:

Table 6: Estimated Number of Positions at the Mine Site, Operations Phase

Position	Employees
Heavy Equipment Operator	2
Haul Truck Driver	6
Production Drill Operator	2
Crusher Operator	2
Utility Driver	2
Mine Technician/Surveyor	2
Maintenance Technician	6
Total	**22**

It is also estimated that the Project will employ three administrative positions and one qualified health practitioner. The qualified health practitioner will be stationed at the Project site and work day shift only (although they will be on call to attend to first aid and medical emergencies during the 12-hour night shift). The health practitioner will be employed during operations, 10 months per year. An Operations Manager and Assistant Operations Manager will also be hired. They will work on opposite schedules, rotating between the Project site and the Sisimiut office. The Operations Manager will be employed on a full-time basis, while the Assistant Operations Manager will work on a ten month schedule. The administrative office, which will be located in Qeqqata Kommunia at a site not yet determined, will also have an administrative assistant who is employed on a full-time basis.

Indirect employment will also be created from outsourced activities related to the Project. This will include catering, housekeeping, laundry and general grounds keeping staff. Contractors will also be on a work rotation similar to directly employed Project staff, and therefore only one cook will be on site at a time. A preliminary list of contractors that will be required for the operations phase is provided in Table 7.

Table 7: Estimated Number of Contractors Employees, Operations Phase

Position	Employees
Cook	2
Assistant Cook	2
Cleaners	2
Laundry	2
Utility Person	2
Security Personnel	2
Total	**12**

In addition, there may be a limited number of induced jobs in the wider economy that are created because of Project related activities. An employment multiplier factor between 1.3 - 1.6 has been estimated for the existing and planned developments in Greenland (Alcoa project, Nalunaq Mine and oil and gas activities). This means that for each job (direct and indirect) created at the Project, 0.3 to 0.6 additional jobs may be created in the wider economy (Grontmij, 2013). This translates to approximately 17 to 34 induced jobs being created in the wider economy during the operations phase.

No adverse effects are identified for direct, indirect and induced employment due to Project activities. No mitigation measures are required. Beneficial effects are identified and enhancement measures include:

- A target of at least 50% of the construction phase workforce will be Greenlandic;
- At least 80% of the operations phase workforce will be Greenlandic, over time;
- Implementation of a hiring strategy that will be communicated widely throughout the LSA, including to employment centres and educational and training institutions;
- Implementation of training and apprenticeship programs to reach employment targets and to support career advancement; and,
- Implementation of workforce education and training programs to support career advancement into semi-skilled, skilled and management positions.

Residual beneficial effects related to employment are classified in Section 3.6.

4.1.2 Local Procurement

Key Question: What effect will the Project have on Local Procurement in the LSA and Greenland?

Detailed procurement lists and potential sources of supply of goods and services have not yet been developed for the Project. It is expected, however, that local procurement will occur primarily during the operations phase as most capital equipment[4] required for construction of the Project will be sourced from Europe and North America and brought by ship to the Project site.

During the operations phase, approximately DKK 31.4 million will be spent annually in Greenland, approximately DKK 12.5 million of this will be for direct labour costs. The remaining DKK 18.9 million will be used to purchase goods and services in Greenland (Brady and Hains, 2014), with priority being given to goods that can be purchased in the Qeqqata Municipality. This will be the main direct positive impact on business life from the Project.

The types of goods and services that will be locally procured include:

- Food, such as meat (fish and game) and other groceries;
- Construction workforce (estimated to be between 50 and 75 people);
- Fuel (for vehicles and generators);
- Spare parts for machinery and small equipment;
- Clothing and safety equipment for workforce;
- Services to the camp (catering and housekeeping); and
- Transportation of goods and staff (water taxis)

LSA residents in the towns and settlements of the Qeqqata Municipality are also likely to fill positions and provide catering, laundry, cleaning and associated services to the Project and its accommodation camp facilities.

The Project will put in place measures to ensure procurement of local supplies such as food, fuel and transport does not put pressure (availability or price inflation) on the availability of these goods and services for local consumption.

The potential for inflation to be an adverse effect on communities due to the Project's procurement activities is low because the Project's needs are small. The Project will, however, monitor local prices to ensure that Project related procurement does not drive up prices for local food, goods and services. No residual adverse effect is predicted.

[4] Capital equipment to be brought into Greenland may include: excavator, haul trucks, front end loaders, mobile drill, mobile and static crushers, crane, steel for construction, process plant equipment, concrete batch plant, ship loader, modular camp facility and generators.

Beneficial effects of local procurement are identified and enhancement measures include:

- Establish detailed procurement lists and make them publically available to local businesses and industry associations; and,

Residual beneficial effects related to local are classified in Section 3.6.

4.1.3 Economic Growth and Diversification

Key Question: What effect will the Project have on Economic Growth and Diversification in the LSA and Greenland?

The identification of areas of potential economic growth and diversification, as well as the Project's potential effects on business life in the LSA and in Greenland are generally based on input from stakeholders and analysis of baseline trends.

The local economy of the Qeqqata Municipality is dominated by the public administration, construction business and wholesale trade sector which account for almost 57% of total employment (Statistics Greenland, 2012b). The construction sector may see some growth from Project construction although the construction phase is estimated to be 6 months only. The Project may act as a driver of growth in the service sector, due to Project requirements for housekeeping, catering and transportation services. This growth is likely small but can lead to some indirect growth in these sectors.

The Project's demand for labour may have effects on the fishing, hunting, and meat processing industries. Harvesting and processing of fish and meat is an important industry in the Qeqqata municipality and account for as much as 50% of local employment in some settlements and towns in the LSA (pers. comm. Kangerlussuaq Settlement Council, 2012; pers. comm. Kangerlussuaq Hunters and Fishers, 2012; pers. comm. Qeqqata Municipal Council, 2012). There is some indication that fisher people and hunters may move away from hunting and fishing activities towards working in the natural resource industry (pers. comm. Maniitsoq Hunters and Fishers, 2012), the latter of which pays well and in some respects is more predictable. One disincentive for resource harvesters to seek employment with the Project, however, is that if hunters or fisher people earn more than half of their incomes from other activities, they are subject to losing their licenses which are granted by the municipality.

The tourism industry is continuing to grow in importance in Greenland. It is not expected that the Project's requirement for labour will impact the growth or sustainability of the tourism industry. An assessment of the potential effects of the Project's land use on tourism and recreational activities can be found in Section 3.5.2 Recreational Land and Resource Use.

No adverse effects are identified on economic growth due to Project activities. No mitigation measures are required. The Project may lead to modest economic growth and diversification of the economy. It is predicted to be a positive impact of low magnitude.

Residual beneficial effects related to local procurement are classified in Section 3.6.

4.1.4 Employment Incomes

Key Question: What effect will the Project have on employment incomes in the LSA and Greenland?

The average annual personal gross income in Greenland was DKK 207,349 in 2011. In the Qeqqata Municipality average annual wages were slightly lower at DKK, 200,464 in 2011. Wages were approximately 3.5% higher in the towns than the settlements in the Municipality (Statistics Greenland, 2013a).

Full-time salaries for the construction and operation phase will be competitive and are estimated to average about DKK 35,000 / month (or DKK 420,000 / year). Although this is substantially higher than average annual wages in the municipality and in Greenland, these wages have not been disaggregated by skill level and therefore include wage levels of management and highly skilled workers. When establishing wage rates by skill type, Hudson will ensure that wages are in line with Greenlandic wages for the various skills and work experience.

No adverse effects are identified on employment incomes due to the Project. No mitigation measures are required. The Project may lead to higher incomes for direct and indirect employees. It is predicted to be a positive impact of low magnitude.

Residual beneficial effects related to local are classified in Section 3.6.

4.1.5 Taxation Effects

Key Question: What is the tax revenue contribution to Greenland from the Project?

An economic benefit of the Project to Greenland is the anticipated tax revenue contribution. Tax revenue will be collected from:

- Company taxes, including royalty fees and corporate taxes payable by the Project directly to Greenland;
- Income taxes, including tax on the income earned by local employees and foreign employees employed by Project; and
- Multiplier effect of employment income as a result of spending by Greenlandic Project employees.

The table below (Table 8) summarises the estimated direct tax revenue contribution based on the initial 20 year life-of-mine Project projections:

Table 8: Summary of Estimated Tax Revenue Contribution from the Project

Greenland Taxes	Estimated Tax Revenue Contribution on Initial 20-year Life-of Mine Projection (until 2036)
Company taxes	DKK 25.1 million

Greenland Taxes	Estimated Tax Revenue Contribution on Initial 20-year Life-of Mine Projection (until 2036)
Income taxes by employees	DKK 115.4 million
Multiplier effect	DKK 34.6 – 69.2 million
Total	**DKK 175.1 – 209.7 million**

Note: Corporate and Dividend Taxes are estimated by BFS Engineer based on the Financial Model presented in the Bankable Feasibility Study (Hains Engineering Company, 2014)

Company Taxes

The following tax framework has been used to estimate the Project's company tax contribution.

- **Royalty fee:** Subject to final agreement between the Government of Greenland and Hudson Resources, a 2.5% royalty fee based on the Project's revenue is anticipated. This is based on the latest disclosed Mineral Strategy paper by the Government of Greenland (2014). Corporate tax and dividend tax are expected to be deductible from the total annual royalty fee. This implies the royalty fee is a minimum annual tax that is reduced or eliminated if the Project pays corporate or dividend tax in Greenland.
- **Corporate tax:** The corporate tax rate applicable to companies holding a licence under the Mineral Resources Act is 30% (Deloitte, 2011). The taxable income is determined on the basis of the profit disclosed in the statutory annual report, adjusted to comply with the prevailing tax provisions. Adjustments include tax depreciations on fixed assets (rather than those applied for financial accounting), tax losses carried forward, and dividend taxes paid.
- **Dividend tax:** Greenlandic companies that distribute dividends must withhold a dividend tax on the dividends that they pay (Deloitte, 2011). The applicable dividend tax corresponds to the personal income tax rate in the municipality of registration. For companies with licences under the Mineral Resources Act, the dividend tax is the municipal tax rate that is applied by the Greenland Tax Agency, currently 36% (Skattestyrelsen, 2013a). Dividend payments are deductible when calculating the corporate tax. This effectively avoids double taxation of corporate income, and is an incentive for companies to retain earnings in the company because they will benefit from a lower corporate tax rate.
- **Tax losses:** Companies holding exploration or exploitation licences under the Mineral Resources Act may carry forward tax losses indefinitely (Deloitte, 2011). This provision allows previous tax losses made due to exploration expenses to be deducted from future taxable profits made as the Project enters the operations phase.

- **Environment duty on energy products:** A duty of DKK 0.10 per litre will be applied on all imported diesel (Parliament of Greenland, 2010). Although technically levied on the importer of the fuel, this has been included in the Project's company tax projection given the amount of diesel that will be required over the 20-year operations phase. The Project has acknowledged that this duty will ultimately be paid by the Project through fuel purchases.

The total projected taxation from the above company taxes for the initial 20 years of operating the Project, from 2016 to 2035, has been estimated to be DKK 25.1 million. The royalty fee and corporate tax estimate made by Hudson is based on the projected price realised from the production of 200,000 tonnes of anorthosite per annum, less the projected operating expenditure, taxable depreciation on capital expenditure and tax losses from exploration carried forward. The estimate reflects investment made by the company that will operate the Project, including exploration costs and capital expenditures invested in the Project.

Personal Income Taxes

The following outlines the current personal income tax framework for employees of the Project working in Greenland. This personal income tax framework has been used to estimate the Project's income tax contribution.

- **Greenlandic employees:** Employees that have lived for more than six months in Greenland prior to working on the Project are considered Greenlandic tax residents (Skattestyrelsen, 2014). The income of these employees is taxed at a flat rate. They are eligible for certain tax deductions and a personal tax free allowance. A summary of personal income taxes are:
  - The personal income tax rate depends on the municipality of residence, and currently varies between 42-44%. In the LSA (i.e. Qeqqata Municipality and Nuuk) the current tax rate is 42% (Skattestyrelsen, 2013a). This rate has been applied to calculate the anticipated taxes payable for employees of the Project who are Greenlandic tax residents.
  - Allowable tax deductions include certain interest charges and pension savings, which can be deducted at the actual charge; or by deducting an allowed standard tax deduction. The current allowed standard tax deduction is at a rate of DKK 10,000 per year (Skattestyrelsen, 2013b). For estimation of the Project's income tax contribution, it is assumed that all employees of the Project are using the standard tax deduction allowance of DKK 10,000 per year.
  - The personal tax free allowance is currently established at DKK 48,000 per year (Skattestyrelsen, 2013b). With the allowed standard tax deduction of DKK 10,000, this implies that a total of DKK 58,000 of personal income is tax free per year, or DKK 4,833 per month. For the purpose of estimating the Project's income tax contributions to Greenland, it has been assumed that employees used during the operations phase will use the full annual personal tax free allowance for their income from the Project.

- **Expat fly-in / fly-out workers:** Employees who are brought into the country on a fly-in / fly-out (FIFO) basis to work on the Project will be taxed at a gross tax rate of 35% of the income that they earn while working in Greenland (Skattestyrelsen, 2014). No personal tax free allowance or tax deductions are allowed. The only exception is that certain pension savings payable by the employer to Greenlandic or Danish pension funds can be deducted. This is a final tax collected at source. The employee is not eligible for any tax refunds and is not required to file a Greenlandic tax return (Deloitte, 2011).

  Expat FIFO workers may also be liable to pay taxes in the country where they reside, according to the tax regulations of that country. This tax liability will be subject to that country's tax regulation and any effective double taxation treaty in place between Greenland and that country. Any such tax provides no benefit or negative impact to Greenland and is therefore outside of the scope of this assessment.

For both groups of workers benefits such as free board, lodging and telephone use whilst on site are considered taxable benefits by the Greenland Tax Agency (Deloitte, 2011). Standard rates for the value of the taxable benefit apply. For 2014 the following day rates apply: Free board, DKK 68/day; free lodging, DKK 31/day; and free telephone, DKK 16/day (Skattestyrelsen, 2013c). In total, workers will be set an additional DKK 115/day whilst onsite in taxable benefits.

Direct personal income tax derived from the project will accrue from both the construction period in 2016 and the initial 20 year operating phase in 2017 to 2036. Table 9 presents the personal income tax cases for the construction and operation phases.

For both estimates (construction and operation), the annual income tax per worker category is calculated by applying the income tax framework (outlined above) by a weighted average of the total annual salary, multiplied by the number of projected employees. The total annual salary for each phase has been projected in the Project's Feasibility Report on the White Mountain Anorthosite Project, dated April 8, 2014, by Hains Engineering Company Limited. During the one year construction phase, it is assumed that Greenlandic workers will use an average of 6 months personal allowance for this Project. During the production phase, the number of employees includes the projected number of contractors who will be indirectly employed by the Project. The number of operation phase contractors working at the Project site is outlined in Table 7. No income tax for the decommissioning phase of the Project has been estimated. It is anticipated that the Project will continue to operate after the initial 20 year operations phase, subject to market conditions.

The total projected personal income tax contribution of Project employees during the construction phase in 2015 and the initial 20 year operations phase (2017 to 2036) is therefore estimated to be DKK 115.4 million.

Table 9: Estimated Greenland Income Tax Directly Attributable to Employment at the Project

Phase	Worker Category	No. of Expected Workers	Annual Income Tax (1,000 DKK)	Total Income Tax (1,000 DKK)
Construction phase (2016)	Greenlandic workers	10	1,068	1,068
	Expat FIFO workers	10	991	991
Total, construction phase		*20*	*2,059*	*2,059*
Initial operations phase (2017 – 2036)	Greenlandic workers	49	4,504	90,080
	Expat FIFO workers	12	1,163	23,260
Total, operations phase		*61*	*5,667*	*113,340*
Total				**115,399**

Note: Corporate and Dividend Taxes are estimated by BFS Engineer based on the Financial Model presented in the Bankable Feasibility Study (Hains Engineering Company, 2014)

Indirect Tax Revenue to Greenland (Multiplier Effect)

Further tax revenues to Greenland will be generated when employees use their income to purchase goods and services in Greenland. This spending has the potential to be an economic driver that may create new jobs, and therefore additional income tax revenue to Greenland. This is generally referred to as the multiplier effect. The magnitude of this effect depends on how much of the income is spent on consumption in Greenland, as opposed to savings or spending abroad (including imports).

As outlined in Section 3.1.1 above, an employment multiplier factor of approximately 1.3 to 1.6 has been estimated for the existing and planned developments in Greenland (Alcoa Project, Nulunaq Mine and oil and gas activities). Using the same multiplier factor implies that for each unit of direct income tax collected at the Project, an additional 0.3 to 0.6 units of income tax is likely to be created in the wider economy. This translates to an additional income tax to Greenland during the construction and initial 20 years of operations of DKK 34.6 to 69.2 million, based on the total estimated direct tax impact of DKK 115.4 million. The resulting total direct and indirect income tax impact is therefore projected to be DKK 150.0 to 184.6 million over the construction and 20-year operation phase.

Uncertainty Related to the Tax Scenario

The projected tax impact of the Project is based on the base case of constructing and operating the Project for the initial 20 years at a level of 200,000 tonnes annual production. No alternative production scenario has been modelled by Hudson.

A level of uncertainty exists in the modelled base case scenario related to market demand for anorthosite and associated price fluctuations (Hains Engineering Company, 2014). Anorthosite is a new commodity with no existing market known. Hudson has researched its use in the manufacture of reinforcing glass fibre, E-glass. This research indicates that anorthosite is a superior material to that of kaolin, which is currently used when manufacturing E-glass. Advantages that have been reported include higher production yield and reduced energy consumption. Hudson anticipates that the production of E-glass is growing annually at an approximate rate of 1.5 times the global GDP growth. As the sources of kaolin are limited, Hudson anticipates meeting its target of 200,000 tonnes annual production, once the value of using the anorthosite is fully established with end users. Hudson also anticipates that the demand will increase beyond 200,000 tonnes annually once the market has been established, which would increase the taxes to Greenland from the Project. This scenario may also lead to the Project increasing its annual production of anorthosite. Increases of 25% to 50% in output will not require any additional staff since the project can handle this additional capacity based on its current plans. However, any output in excess of this may in turn lead to increased employment at the Project, leading to an increase in the total income tax generated as a result of the Project. At this point, any additional demand has not been factored into the projected estimates for the initial 20 years of operation.

On the other hand, there is also uncertainty that the indicated market demand anticipated by Hudson is too optimistic and the Project may not realise sales of the expected annual production of 200,000 tonnes at the anticipated price. In this case, an alternative may be to reduce or even stop production, which in turn will reduce the tax revenues to Greenland.

Summary of Tax Impact Assessment

In summary, a total DKK 175.1 – 209.7 million of direct and indirect tax revenue are estimated to benefit Greenland during construction and the initial 20 years of production (2017 to 2037). The largest contribution is anticipated to be from direct income taxes from Project employees and the indirect economy wide tax impact through the multiplier effect from this employment.

The average annual tax benefit to Greenland during the 2017-2037 period as a result of the Project is estimated at DKK 8.7 – 10.4 million. This is less than 0.1% of Greenland's annual GDP (compared with the total GDP in 2011 of DKK 13,960 million). No adverse impact on tax contribution to Greenland due to the Project has been identified. Consequently, the Project's tax contribution is predicted to be a positive long term benefit of low magnitude.

4.2 Education and Training

4.2.1 Workforce Skills Development

Key Question: What effect will the Project have on Workforce Skills Development of local and Greenlandic employees?

The Project is expected to be beneficial to training and skills development for the Project workforce.

Over the 6 month construction phase, approximately 20 FTE positions will be created by the Project, a minimum of 50% of which will be filled by residents of Greenland. During operations, approximately 49 direct employees will be required, a minimum of 80% of which will be Greenlandic.

The majority of workers required for all Project phases will be semi-skilled and skilled; haul truck drivers, heavy equipment operators, drill operators, plant workers and mechanics will make up most of the labour force. Some level of training and development will be required for these semi-skilled and skilled workers. The mine manager and production superintendent will require significant operating experience (which does not currently exist in Greenland), but it is expected that these positions could ultimately be filled by Greenlandic workers, after on-the-job training.

Hudson will initiate training plans once the workforce has been selected. It is anticipated that training would take place in the 6 months prior to the mine start-up for most workers. Some of the training, such as truck driving, may take place on site and other programs will be conducted from classrooms in one of the local communities.

The beneficial effect on workforce skills development is expected to be of medium magnitude because it will noticeably improve skills and capacity of mine workers, albeit predominantly for a small proportion of Greenland's population. The effect will extend primarily to the direct Project workforce, the majority of which will be sourced from across Greenland, resulting in a national-level effect. This beneficial effect is expected to be long-term, lasting beyond the life of the Project, because some of the skills developed through training and experience will be transferable to other projects or industries.

No further mitigation or benefit enhancement measures are required. This beneficial effect is advanced for a classification of the residual impact.

Residual beneficial effects related to workforce skills development are classified in Section 3.6.

4.2.2 National and Local Education

Key Question: What effect will the Project have on the education levels in the LSA and Greenland?

The Project is expected to have a positive, albeit negligible, effect on education levels in the LSA and across Greenland. Overall, the mix of unskilled, semi-skilled and skilled workers required for the Project is not expected to either entice or discourage youth to remain in school or seek graduate or post-graduate educational opportunities in Greenland or elsewhere. Increased household income levels of Project employees may enable their children to remain in school or seek further education instead of entering the workforce to support their families, but it is difficult to predict this outcome with any certainty.

No further mitigation or benefit enhancement measures are required. Residual beneficial effects related to national and local education are classified in Section 3.6.

4.3 Public Infrastructure, Services and Economic Development

4.3.1 Physical Infrastructure

Key Question: What effect will the Project have on physical infrastructure in the LSA?

Potential effects on physical infrastructure in Qeqqata Municipality and the capital city of Nuuk could result from the use of existing infrastructure by the Project, its staff, and/or Project-induced in-migrants. The potential effects on physical infrastructure will be assessed in consideration of:

- utilities (i.e., water, power, waste and sanitation);
- transportation (e.g., the use of Air Greenland flights and local ports for the transportation of personnel associated with the Project); and
- telecommunications.

Effects to infrastructure and public services are typically a function of population change. Population change is considered to be cumulative and incremental, occurring throughout the life of the Project and beyond. During the construction phase, approximately 20 workers are expected to be contracted by the Project. The number of direct employment positions is projected to be 49 positions during the operations phase, with an additional 12 contractors being employed, totalling 61 positions. It is also expected that some Project-induced migration will occur amongst individuals who hope to find direct, indirect or induced employment with the Project.

Project-induced in-migration, and consequently, impacts to local services and infrastructure, will be limited by local hiring targets. Greenlandic people are targeted to comprise 50% of the construction workforce (10 positions) and 80% of the of operations workforce (49 positions). These individuals (and their families) would already be accessing services and infrastructure in Greenland, and likely from the Qeqqata Municipality and Nuuk, and therefore would not place any additional stress on these systems. The Project would bring a maximum of 10 foreign workers to the Qeqqata Municipality during the construction phase and 12 foreign workers during the operations phase. Except for transport infrastructure, foreign workers are not expected to draw heavily on physical infrastructure as they will be housed at an accommodation camp on the Project site.

As identified above, physical infrastructure refers to utilities, transportation, and telecommunications in the LSA. Towns and settlements rely on lake surface water for their drinking supply. Potable water systems in Nuuk and Maniitsoq have surplus capacity, whereas those in Kangerlussuaq and Sisimiut operate at capacity. Solid waste is incinerated where possible, and alternatively sent to landfills. While there is additional capacity at the incinerator plants in Maniitsoq and Sisimiut, the plant in Nuuk is operating at capacity. Responsibility for wastewater lies with the municipalities: towns have access to sewage systems, whereas settlements rely on sewage tanks or septic bags.

The Project will supply most of its own physical infrastructure. Two 400 kW diesel generators will be used to produce all on-site power, and water will be drawn from a lake near the Project site. Organic refuse will be incinerated or buried and composted, according to local regulations. Waste that cannot be incinerated will be shipped to the nearest town for disposal (Sisimiut), where additional capacity exists. Wastewater will be treated through two self-contained, small-scale Eco-line Mini sewage systems, installed for use at the Project site. As a result, Project activities are not predicted to place any strain on local utilities.

Transportation is dependent on air and water infrastructure as there are no roads connecting communities in the LSA. Each town has an airport operated by the Greenland Airport Authority, Mittarfeqarfiit. Air Greenland offers charter services to mining firms, including the transportation of employees, if required. All of the towns and five of the settlements in the LSA have harbours: recent expansions have resolved capacity issues in Sisimiut and Nuuk, but some capacity issues remain at the Kangerlussuaq and Maniitsoq harbours. Nevertheless, the Maniitsoq harbor (located closest to the Project site) could still accommodate growth (Qeqqata Municipality, 2011; pers. comm. RAL, 2012).

In order to support the Project's transportation needs, Hudson will construct a 10 km haul road and a port. The road will move workers between the port and the mine, and move materials between the mine and the process plant at the port. The port will allow for local workers to travel to and from the Project site by boat, and will be used to move materials out to market. Hudson will work with the Qeqqata Kommunia to develop a detailed boat transportation plan that will service all the key communities in the Kommunia.

Hudson will also transport employees to Kangerlussuaq on scheduled Air Greenland flights. The number and origin of flights will be established based on the location of employees. Air transportation is expected to be used mainly for foreign employees and employees that are from outside of the Qeqqata Municipality. The use of air transport services has the potential to affect the availability of flight seats for Greenlandic residents and tourists, especially during the summer months. However, the number of direct Project employees using these flights would be small, and if demand continued to increase, it is likely that Air Greenland would simply add additional flights to their schedule to accommodate these increased business opportunities. As a result, the Project is not expected to impact air transportation capacity.

Greenlandic employees, particularly from Qeqqata Municipality, will mainly travel to work using passenger boats from existing local port facilities in towns and settlements to the port on the Sondre Stromfjord near the Project site. All harbours in the Project area are identified as having some additional capacity, with the exception of the Kangerlussuaq harbour. However, the Project would only generate increased boat traffic twice a month, for a small number of people. Therefore, Project activities are not predicted to increase stress on water-based transportation infrastructure.

Radio and newspaper represent the main forms of communication in the LSA. In general, broadband internet and GSM mobile telephone services are available for communities with more than 70 inhabitants. Internet is typically only available in offices, not in private homes (TELE Greenland, 2014a; pers. comm. Sarfannguit Settlement Council, 2012; pers. comm.

Itilleq Settlement Council, 2012; pers. comm. Napasoq Settlement Council, 2012; pers. comm. Atammik Settlement Council and Hunters and Fishers, 2012).

The Project would not use communications infrastructure established for the LSA communities. Any use of radio communication, satellite phones or internet connections at the Project site would not impede local usage.

As discussed above, there will be negligible levels of direct or induced in-migration resulting from the Project. The relocation of workers and their families to the LSA would be small and spread across various communities, and therefore would not generate sufficient demand to strain existing physical infrastructure. Based on the information above, no adverse effects are identified on physical infrastructure due to the Project activities. No mitigation measures are required. No residual adverse effects are predicted on physical infrastructure due to Project activities.

4.3.2 Social Infrastructure

Key Question: What effect will the Project have on social infrastructure in the LSA?

Potential effects on social infrastructure in Qeqqata Municipality and the capital city of Nuuk would be related to the use of existing infrastructure by the Project, its staff, and/or Project-induced in-migrants. The potential effects on social infrastructure will be assessed in consideration of:

- housing (i.e., permanent and temporary accommodations);
- education (i.e., primary and secondary);
- health and social services;
- emergency services (i.e., police, fire and emergency medical services); and
- recreation.

The LSA faces housing challenges, with waitlists for municipal housing (883) and self-owned housing (284) (Qeqqata Municipality, 2012). Private housing is limited and there are particularly long housing waitlists in Sisimiut, which have prevented Greenlandic residents from relocating there. The Municipality is undertaking home renovations and the development of new single family homes in Maniitsoq in an effort to improve housing availability (Qeqqata Municipality, 2012). There is greater availability amongst temporary accommodations in the LSA. Based on available data, there are temporary accommodation facilities with capacity, 81 rooms in Sisimiut, 39 rooms in Maniitsoq and 86 rooms in Kangerlussuaq.

In order to minimize Project-related use of existing social infrastructure, Hudson will construct a permanent, fully-catered camp to house employees, transporting workers from their home communities to the Project site using a fly-in-fly-out or a water taxi system with designated pick up spots to limit people relocating to communities near the Project site.

Local workers from Qeqqata Municipality would have homes in the LSA, and therefore would not contribute to further housing demand. Only a small number of Project-induced in-migrants may seek housing in communities near the Project site. Moreover, Project-induced migrants who choose to temporarily move in with local friends or family while they seek employment and/or housing could affect levels of overcrowding. While not a widespread issue, overcrowding is a concern in Sisimiut, the largest town in the municipality. Sisimiut has an average of 5.9 people per dwelling (Greenland 2010).

In order to mitigate additional housing demand, local hiring targets will be exercised and recruitment and hiring practices will be communicated clearly to prevent people from moving to the LSA communities without secure employment. The Project will also establish pick-up points or arrange transportation for Project workers to enable them to stay in their home communities, and not relocate to Qeqqata Municipality.

Employees arriving at Kangerlussuaq airport will travel to the Project site on the same day that they arrive. It is possible, however, that on some occasions Project employees arriving at Kangerlussuaq may stay overnight while awaiting further transportation to the Project site due to flight schedules and/or weather conditions. The 86 temporary accommodation units in Kangerlussuaq are sufficient to meet Project needs. The Project is not likely to limit the availability of temporary accommodations for Greenlandic and international tourists, even during the summer months when there is a higher demand for temporary accommodation by tourists. In order to ensure that the Project does not have any effect on the availability of temporary accommodation, it is recommended that the Project undertake annual monitoring of temporary accommodation vacancy in Kangerlussuaq during the construction and operation phase, to ensure that Project use is not limiting temporary accommodations for tourist use.

All communities in the LSA have primary schools; however students from settlements must relocate to the towns for secondary and tertiary education. A limited number of Project employees may choose to move into the LSA with spouses and children who require primary and secondary education. Project employees from the LSA who have children will already be enrolled in local schools, and will not contribute to any additional demand on the education system. There is no data to suggest that local schools are over capacity, and the anticipated number of Project-induced in-migrants is projected to be small, and therefore any school-aged children moving into the LSA would likely be rather easily accommodated. As a result, no Project effects on education are predicted.

Hospitals can be accessed in Sisimiut and Nuuk (Qeqqata Municipality, 2014a). Clinic services are available in Maniitsoq, while settlements rely on in-community health care workers or nurses, and people must travel to larger centres for more serious issues (pers. comm. Itilleq Settlement Council, 2012). In order to reduce impacts to local health services, medical facilities will be established as part of the accommodations complex. There will be a qualified health practitioner on-site during construction and operation, providing first aid and consultation services for minor health issues. Furthermore, a health practitioner may be on site during closure if the workforce is of such a size that it is warranted. For medical

emergencies and complicated health issues, patients would be transferred by boat or helicopter to hospitals in Sisimiut or Nuuk. Considering that medical services will be provided to workers on-site, and that use of local clinic and hospital services would be sporadic, the Project is not likely to affect demand on local health services.

Direct Project employees and their families would also access healthcare service facilities outside of work hours, on an as-needed basis. As the majority of workers would already be residents of the LSA, they would not generate any new demand on these services. Any project-induced in-migrants would also access health care in the LSA. Given that induced population growth from the Project is expected to be low, it is unlikely that new residents would affect healthcare service capacity in Nuuk or in the Qeqqata Municipality.

Similarly, Project-induced in-migrants are not predicted to affect demand on social services in the LSA. The number of children under the age of 5 moving into the Qeqqata Municipality as a result of the Project would be low, and would not cause a noticeable increase in demand for daycare services.

Should the prevalence of substance abuse increase as a result of the Project, a slight increase in associated crimes may be expected (i.e., impaired driving, property crimes and substance abuse). It may also result in an increase of other negative social pathologies such as gambling or physical and mental abuse. This could result in increases in the level of emergency (police, ambulance, fire) and social service demand in the LSA. There are a total of 18 police offers in the LSA, located in Sisimiut (16) and Kangerlussuaq (2). They patrol the settlements by police ship on a weekly or bi-weekly basis (pers. comm. Sisimiut Municipal Police, 2012). Thirty-one firefighters serve Sisimiut, while Itilleq and Sarfannguit have 10 part-time firefighters with limited equipment (Qeqqata Municipality, 2014b). To limit pressure on local law enforcement and emergency services, the Project will prohibit drug and alcohol use amongst staff at the Project site. Project personnel will also be transported between their home communities and the Project site and zero tolerance for alcohol and drug use will also be enforced during transport to and from the Project site. Hudson will implement a healthy lifestyle campaign to prevent alcohol and drug abuse and to limit tobacco use as per Greenland's health guidelines. In addition, the Project aims to promote a health and safety culture while on site, with the intention that this culture is also transferred by Project employees to their families and communities. The Project will also implement an employee and family assistance program to support workers and their families that may be dealing with substance abuse and related issues. Impacts related to substance abuse are further discussed in Section 3.4 Social and Health Effects.

Furthermore, in order to reduce reliance on local emergency services, medical and emergency response facilities will be established at the Project Site. Hudson's port facility will also have an emergency shelter and communications for fishermen to use if needed, which will add to the safety of fishing in the area. In order to prevent emergency situations, Hudson has developed stringent Health, Safety and Environmental Guidelines that outline policies and procedures in the event of an emergency, including medical, fire, and other evacuation procedures. The Project's use of emergency services is discussed further in Section 3.4.6

Occupational Health and Risk of Accidents. The Project is not, however, expected to affect access to or increase demand of emergency services in the LSA.

Each LSA community has access to at least five recreational activities, although infrastructure and service capacity vary between them (Qeqqata Municipality, 2014c). People also regularly take part in recreational activities such as hunting, fishing, harvesting, hiking and other on the land activities. Project induced in-migration will be minimal and may potentially result in a small increase in the usage of local recreational facilities. None of the recreational infrastructure, however, in the LSA was identified as being at or over capacity, and given the breadth of recreational activities available, it is not anticipated new Project-related residents would place undue stress on existing recreational facilities. Recreation as it relates to land use and water use (i.e., recreational hunting and fishing), is detailed in Section 3.5.2. Recreational infrastructure will also be constructed for employee use at the Project site. It will include a games room, satellite TV, and a fitness room. It is not expected that direct Project employees will put any strain on existing recreational services.

An adverse effect on housing of low magnitude has been identified due to the lack of housing availability (particularly in Sisimiut) and overcrowding due to Project induced in-migration. The proposed measures that will be put in place to mitigate this adverse effect include:

- local hiring targets and recruitment and hiring practices will be communicated clearly to prevent people from moving to the LSA communities;
- establish designated pick up spots to limit people relocating to communities near the Project site; and
- construction of a permanent, fully-catered camp to house employees, transporting workers from their home communities to the Project site.

Upon implementation of these mitigation measures, no residual adverse effect is expected on housing availability or crowding.

No residual adverse effect is predicted on social infrastructure due to Project activities.

4.3.3 Pressure on Planned Developments

Key Question: What effect will the Project have on planned developments in the LSA?

Potential effects on planned developments in Qeqqata Municipality and the capital city of Nuuk would be related to any developments that would need to be modified or cancelled as a result of Project construction, operation, or infrastructure. The potential effects on planned developments will be assessed in consideration of:

- zoning; and,
- planned developments.

The geographic region that contains the Project site is remote, and is largely void of development. Moreover, this area has been licensed for exclusive mineral exploration by the

MLSA. Therefore, the Project does not present any concerns issues related to other zoning uses.

The Project is not likely to affect development plans in Nuuk, as the Project activities will not place a high demand on physical and social infrastructure. The Qeqqata Municipality, as well as several local settlement councils, are seeking to identify and develop local tourism opportunities, which could not occur in the Project area (pers. comm. Sisimiut Business Council, 2012; pers. comm. Kangaamiut Settlement Council and Hunters and Fishers, 2012; pers. comm. Kangerlussuaq Settlement Council, 2012). However, the Project activities are unlikely to impact growth in the tourism industry, given that no potential tourism sites have been identified in the Project area.

The municipality also aims to strengthen transport infrastructure, including the capacity of harbours at Maniitsoq and Kangerlussuaq, which the Project would not impact. The Project is also likely to generate new employment and taxation revenues that would provide the Government of Greenland the Qeqqata Municipality with additional resources with which to implement their planned developments. As a result, there are no predicted negative Project effects on planned developments in the LSA. No mitigations are therefore necessary.

4.4 Social and Health Effects

4.4.1 Demographics and Population

Key Question 1: What effect will the Project have on the population and demographics of the communities in the LSA?

The Project will require 20 employees during the construction phase, with approximately 10 employees (half of total construction employment) being Greenlandic. During operations, the direct workforce requirement will be approximately 49 employees, with an additional 12 contract staff, totally 61 positions. 80% of total operations phase employment is expected to be Greenlandic (49 positions). The Project will aim to hire most local people from the Qeqqata municipality; however some workers may come from Nuuk and other municipalities. The population in Greenland is fairly mobile, and therefore people who have the necessary skillset to work at the Project may choose to relocate to Qeqqata and/or Nuuk in search of Project employment. Some of these people may choose to relocate with their families. While there may be some population in-flux into the towns of Sisimiut or Maniittsoq, Project induced in-migration is expected to be limited.

There is an existing trend in Greenland and the LSA for people to move from smaller settlements in to larger towns. This trend is expected to persist, particularly as younger people relocate to larger centres for educational and employment opportunities. The Project's employment opportunities may be one of several drivers that are encouraging people to seek higher education, particularly skills in mining and related fields, which are available at the Greenland School of Minerals and Petroleum in Sisimiut. Skills development in this sector is also being promoted by the national government through the Greenland Education Program (GEP) reforms. The government has indicated that an objective of the GEP program is to

expand student housing capacity so that towns and cities have the necessary infrastructure to accommodate a growing number of students (Government of Greenland, 2012b)

The expatriate workforce will likely be from Europe or North America. They will be a fly-in / fly-out workforce, and arrive in Greenland for their rotations to the international airport at Kangerlussuaq. From there, they will be transported to the Project by boat or helicopter, and will be housed at the Project's camp accommodations. In most cases, employees will be transported to the Project site on the same day that they arrive in Greenland, however on occasion they may spend one night in Kangerlussuaq on their way in or out of the country, depending on flight schedules and weather conditions. It is not expected that the expatriate worker force will permanently reside in Greenland.

It is not expected that the Project will lead to any substantial demographic changes and/or changes in the population profile. The Project will prioritise hiring in the LSA and provide transportation to the Project site from all settlements and towns in the Qeqqata Municipality and Nuuk. Project employees will therefore be able to live between their home communities and the Project site, which will not require them to relocate with their families.

It is also not expected that a significant number of opportunistic job seekers will arrive in the Qeqqata Municipality, particularly Sisimiut or Maniitsoq, looking for positions with the Project. The Project will limit the in-migration of opportunistic job seekers by clearly publishing employment requirements on their website (in Greenlandic and Danish) and with local employment support centres throughout the LSA and Greenland.

It is therefore not expected that the Project will lead to demographic or population changes. It is recommended that the Project monitor population changes in the towns and settlements of the Qeqqata Municipality periodically through a review of census data and key informant interviews with municipal government representatives.

There is a low potential for an adverse effect on demographics due to Project induced in-migration. The Project will mitigate this effect by:

- prioritizing hiring in the LSA of qualified people;
- providing transportation to the project site from all settlements and towns in the Qeqqata Municipality and Nuuk;
- clearly publishing employment requirements on their website and with local employment support centres throughout the LSA and Greenland; and
- monitoring population changes in the towns and settlements of the Qeqqata Municipality periodically through a review of census data and key informant interviews with municipal government representatives.

Upon implementation of these mitigation measures, no residual adverse effect is expected on demographics or population.

4.4.2 Land Acquisition and Displacement

Key Question 1: Will the Project lead to land acquisition or displacement in the LSA?

The Project is located in a remote region of the Qeqqata Municipality, approximately 75 km southwest of Kangerlussuaq and approximately 75 km southeast of Sisimiut. There are no settlements in the Project footprint and therefore no land acquisition or physical displacement will be required for Project activities.

It is expected that there will be a limited amount of economic displacement due to Project effects on hunting and harvesting areas in the vicinity of the Project site. The Project area has few caribou and muskox are rare, and hunting of these species occurs by recreational hunters. Aerial surveys conducted by the Greenlandic Institute of Natural Resources shows that the Project area has a rather limited population density of caribou and muskox compared to other regions of the Qeqqata Municipality and as a result, only a few hunters visit this area.

There is one abandoned campsite in the vicinity of the proposed dock that was previously used by hunters during the summer season. One campsite user (the only person who could be identified) has indicated that he does not need compensation for loss of access to the campsites, although this was offered by Hudson's[5]. No other areas have been identified where there will be displacement due to Project activities.

Harvesters, who have used the Project site in the past, may lose access to some areas used for hunting, fishing and gathering due to the Project site. Hunters and fisher people will be able to access the area directly around the Project and there will be no fence constructed to limit their entry to the site. People will not, however, be able to use the 10 km Project access road between the site and the dock due to safety considerations. It is expected that natural resource harvesters will voluntarily move to other sites as Project activities are likely to drive away animals. They are not expected to be negatively affected by the Project as there are many alternative areas of equal or higher productive capacity where they can go to hunt and fish. The availability of alternative areas for hunting and fishing in the LSA is discussed in more detail in the Cultural and Natural Values IA (Section 3.5).

No residual adverse effect is expected as there is no land acquisition required by the Project, and loss of access to the land in the footprint will have a negligible effect on harvesters. No mitigation is necessary.

[5] The campsite user was contacted Hudson Minerals in July 2013.

4.4.3 Community Well-being

Key Question 1: What effect will the Project have on the well-being of the people living in the communities in the LSA?

Key Question 2: What effect will the Project have on individual, family and community cohesion of communities in the LSA?

Potential effects on individual, family, and community well-being from mining and resource development can be indirect and complex. Well-being is closely linked to potential effects on community economies and traditional culture. It is also related to the continuation of traditional lifestyles, culture and language. Increased incomes, stresses related to rotational work and changes to social capital are some of the drivers that have the potential to affect well-being.

The extent to which social and cultural values will change in the LSA cannot be solely attributed to the activities of the Project. LSA communities are experiencing change on many fronts – including the diversification of the economy into the petroleum, mining and resource exploitation and tourism industries. There is also a push for raising the standard of education amongst youth, which seems to be driving them to relocate from settlements (where they pursue more traditional lifestyles) to towns in search of higher education and formal sector employment opportunities.

Changes to well-being may occur at the individual, family or community level. Some Project effects on well-being would be expected to be positive, particularly those related to economic development. Others, such as affects to land use (and therefore the practice of cultural activities such as harvesting) may not positively impact well-being (see Section 3.5). A number of factors that raise potential concern include: cultural change, influx of a foreign workforce, negative social behaviors and lack of access to Project benefits.

This section will assess individual and community well-being in consideration of the potential effects from the Project to employees, their families and communities in the LSA. The attributes that will be discussed include the potential Project effects on well-being in consideration of substance misuse, rotational schedules, family and community cohesion, violence and crime.

The effects of the Project are expected to be positive for families with at least one member benefiting directly or indirectly from Project employment. This may include Project employees, contractors or hunters and fisher people who sell a portion of their catch to the Project. These households will have an additional revenue stream and increased financial security. Employees directly employed by the Project will receive competitive salaries, which may lead to an increase in their disposable income and positively impact them and their households. Likely benefits may include less demand for government run social assistance programs, more money for school fees and increased disposable income for their families. Extra income may also result in increased savings (including retirement savings) or investments in assets such as privately owned homes.

On the other hand, some Project beneficiaries may also spend their income on negative social behaviors such as drugs and alcohol which would not only be detrimental to their individual well-being, but also to their families and community. The impacts of substance abuse are discussed further in Section 3.4.4 below, Physical and Mental Health.

The rotational schedule will be established after consultation with the communities and the Greenland Working Environment Authority to ensure a reasonable rotation that is compliant with the Working Environment Act. The Project workforce will be transported to and from the site by Hudson's via air or water, at no cost to the employee. Studies from Canada on rotational schedules have identified both positive and negative effects on individual, family and community well-being (Storey, 2010; Gibson 2008; Intergroup 2005; Sly et al. 2001). These studies have noted that rotations can limit cross-cultural contact with local communities by out of area or foreign workers and reduces the effect of out of area Project employees using local services and infrastructure. Rotations also limit contact with the general population which may mitigate increases in sexually transmitted diseases including HIV/AIDS among the general population and sex workers, which has been a negative effect of worker influx from mining to communities in other parts of the world (Golderberg et al, 2008; Campbell, 1997).

Rotations may also enable Greenlandic employees to have increased time and resources for traditional cultural activities such as harvesting, enable them to have significant blocks of time to spend with their family, and lead to a more focused workforce ethic while on rotation, leading to higher levels of productivity. Negative effects of rotation, on the other hand, may include increased stress due to absence from the family, which may eventually lead to a breakdown of familial relationships with spouses or children. This can be especially difficult when children are young and the non-rotational spouse must become the primary caregiver when the employee is away on rotation. As the mine is only operational for nine months of the year, and the processing plant ten months, this may give employees greater ability to spend extended periods of time with their families and take on caregiver responsibilities during this two to three month period.

Hudson is proposing that employees at the processing plant will work ten months per year. Hudson will consult with employees before finalizing the work schedules. There is some concern that rotational work and new income can lead some individuals to substance abuse, excessive gambling and inappropriate sexual behaviours. In turn, these behaviours can be associated with physical and mental health problems, domestic violence, family breakdown, poor parenting, crime, suicide, and the general disintegration of social cohesion and public participation, which can affect well-being.

Family and community cohesion may be affected by an increase in perceived inequality between people who access the economic benefits of the Project and those who do not. Some individuals or communities (such as people from smaller settlements) may see themselves as 'left out' from Project benefits. These inequalities may undermine social cohesion and have the potential to create conflict. Income associated with direct or indirect Project work may also lead to changing intra-household relationships, as younger people are

more likely to be employed by the Project. If employees adopt more individualistic values, elderly people who depend on the younger generation to share their resources (money and harvests) may face increased vulnerability. Project employees may also have less time for volunteerism and participation in social and cultural activities which can be a strain on community cohesion.

Inequality and cultural change due to pressure on community cohesion may also lead to increasing rates of crime (property and violent crimes) and effects on public security. Although the rates of crime have decreased Greenland in the last 5 years (UNODC, 2011), key informants note that the majority of crimes are violent crimes (violence, murder and sexual crimes) and that they have been linked to intoxication and substance abuse. As discussed above, there is a potential link between rotational work, increased individual incomes and substance abuse rates. Although an important benefit of the Project will be employment and an increase in incomes, this may also be a driver for crime.

In general, however, the Project's impact on well-being is expected to be negligible as employment rates, community cohesion, and crime are small in comparison to the population of Qeqqata Municipality, Nuuk and Greenland. Therefore changes in well-being are not expected to be significant. Some families who have members employed by the Project may experience both the positive effects and negative effects on well-being. Hudson's will coordinate with public health programs to develop and put in place counselling programs, including employee and family assistance programs to strengthen the capacity of employees to deal with changes to their household function due to Project employment. Details of employee and family assistance programs are developed and outlined in the Impact and Benefits Agreement.

There is a potential for an adverse effect of low magnitude on community well-being due to changes associated with rotational lifestyles. The Project will mitigate this effect by:

- putting in place counselling programs, including employee and family assistance programs, to strengthen the capacity of employees to deal with changes to their household function due to Project employment.

Upon implementation of these mitigation measures, no residual adverse effects are predicted to community well-being due to Project activities.

4.4.4 Physical and Mental Health

Key Question: What effect will the Project have on Physical and Mental Health of communities in the LSA?

Health is broadly defined as a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity (WHO, 2005). There is generally believed to be a positive correlation between employment and improved physical and mental health; increased incomes enable healthier lifestyles. There are, however, a number of potentially confounding factors that can influence physical and mental health. Concerns centre on the consequent health effects of increased substance abuse, changes to diet, lifestyles and cultural changes

associated with increased development. This section will assess potential Project effects on physical and mental health.

The Project is not expected to affect the rates of infectious diseases of the Project workforce or the general population. Increased income may actually enable a reduction in the overcrowded housing conditions in the LSA, which are potentially a contributor to the spread of infectious diseases. Additional income may be one factor leading to the development of more public housing, or Project employees may decide to move into the private housing market. The Project will also put in place a hiring strategy aimed deterring opportunistic job seekers from migrating to the LSA, where they may place additional demand on local housing.

There are high rates of non-communicable diseases in the LSA, particularly diabetes and to a lesser extent cardiovascular diseases. Increased incomes associated with the Project are expected to enable people to lead healthier lifestyles, including money to purchase high quality foods and resources to go hunting and fishing for traditional foods. Rotational work schedules have also been noted to give traditional food harvesters a longer period of time to go out on the land compared to a weekend. The Project will make healthy and nutritious food available to employees when at work. There will also be an option for Greenlandic employees to eat traditional foods at the Project site. Traditional foods will be purchased by the Project from hunters and fishers in nearby communities. The Project is therefore not expected to have negative effects on infectious or chronic diseases, nor on the physical health of workers. There is some potential for positive effects, through worker health and safety training.

One the other hand, there is some concern that increased disposable income can lead to higher levels of drug and alcohol abuse and other negative social behaviours. This may include greater consumption of alcohol, marijuana (and other illegal substances) cigarettes and increase in the rate of gambling. Studies on drug and alcohol consumption rates show that the consequences of alcohol and marijuana misuse are not limited to the user, but also affect family members and the communities. Substance misuse has been associated with sexual abuse and suicidal behavior of children of alcoholics (Bjerregaard, 2004).

Hudson has a zero tolerance policy for drugs and alcohol in the workplace, camp accommodations and during transport to and from rotations in all phases of the Project. These rules apply to all employees and contractors. In addition to these workplace policies, Hudson's will put in place an employee and family assistance program to help any employees and their families who may be suffering from substance abuse and related mental health issues. Project activities, including employment opportunities, are not expected to lead to any substantial increase in mental health and addiction. Additional policies related to employee and community wellness, along with training programs on 'life skills' and the transition to rotational work, may be implemented by Hudson's as part of their Impact and Benefit Plan.

There is a potential for an adverse effect of low magnitude on physical and mental health due to increased substance abuse and negative social pathologies by Project employees. The Project will mitigate this effect by:

- Implementing a zero tolerance policy for drugs and alcohol in the workplace, camp accommodations and during transport to and from rotations in all phases of the Project; and,
- Making an employee and family assistance program available to any employees and their families who may be suffering from substance abuse and related mental health issues.

Upon implementation of these mitigation measures, no residual adverse effects are predicted to physical and mental health due to Project activities.

4.4.5 Environmental Impact

Key Question: What Environmental Impacts have been identified from the proposed Project activities in the LSA?

An Environmental Impact Assessment (EIA), including existing conditions studies, has been undertaken for the Project in line with the requirements of the Mineral Resources Act No 7 (2009). The EIA was undertaken from 2012 to 2014. The EIA assessed the following disciplines:

Physical Environment

- Removal of Ore
- Infrastructure (roads, harbour, heliport)
- Tailings deposition
- Dust
- Emissions
- Waste and Wastewater
- Freshwater changes
- Marine Habitat
- Oil and Chemical Spill into water environment

Ecological Environment

- Vegetation
- Terrestrial mammals and birds
- Marine animals
- Freshwater fish
- Contamination of habitats
- Invasive non-indigenous species with ballast water

- Cultural heritage and human activities

The results of the Environmental Impact Assessment (EIA) determined that the greatest effects to people, from environmental changes due to the Project, would be on wildlife availability for hunting in the Project footprint and surrounding vicinity (< 5 km from infrastructural components). This environmental impact would be low negative, as the animals are likely to relocate because of environmental effects from the Project. The environmental impacts on wildlife are not likely to lead to any social effects, as the area impacted by the Project is small in consideration of the land available for hunting in the LSA. Other physical and ecological environmental indicators are assessed to be minor or negligible in the EIA, and will not result in environmental impacts of significance. The impacts on land use and access to natural areas are assessed in section 3.5 of the SIA.

4.4.6 Occupational Health and Risk of Accidents

Key Question: What are the potential effects of the Project on occupation health and risk of accidents?

Project activities have the potential to increase occupational health and risk of accidents for Project employees and LSA residents using the area surrounding the Project area. Hudson has developed Health, Safety and Environmental Guidelines for the Project (including all its components) in order to:

- Meet or surpasses all relevant regulatory requirements
- Ensure that all employees/contractors on the work site comply with all Greenland health and safety acts, regulations, policies and procedures
- Ensure all employees/contractors comply with safety policies as a condition of employment
- Appoint a designated safety officer on site at all times

The Project's Health, Safety and Environment policy includes standard operating practices for camp and worksite safety, environmental protection guidelines and emergency preparedness plans. Emergency preparedness plans have been developed for: medical evacuation, fire response, spill response, vehicle accidents, blasting accidents, and helicopter accidents.

Hudson has also put in place health and safety measures to minimize risks to worker health and for accident prevention. These measures include, but are not limited to:

- comprehensive worker health and safety plans, training and enforcement procedures;
- comprehensive risk management and emergency response planning and training, including the provision of necessary emergency response facilities and/or equipment;
- regular inspection and maintenance in good condition of i) project vehicles; and ii) transportation infrastructure, including access roads and water crossings, signage, helipad and docking facilities;

- driver training and enforcement of a driver code of conduct to control speeds and encourage safe driving;
- securing all Project facilities with potential to pose worker and public health and safety risks, including prevention of public access to the Project road and other areas where necessary;
- avoiding and minimizing any environmental effects that have the potential to affect public health, including those that may negatively affect livelihood resources; and
- delivering public information and education programs on Project environmental effects and risks to contribute to people's i) understanding of mining activities; ii) perceptions of harm and iii) emergency preparedness.

Hudson will have in-house health services capabilities to address non-life threatening incidents at the Project site. As the majority of Hudson's staff will be Greenlandic, it is not expected that the Project workforce use of public services will place additional financial burden on state services. The Project's use of public health care services, however, can potentially reduce the quality and capacity of state services to the general public. This is because there are a limited number of health care professionals, labs and equipment in Qeqqata Municipality and Nuuk. Hudson will conduct key informant interviews with health care service providers and institutions to monitor if the Projects use of health services is placing excessive pressure on health services.

Hudson will also make sure that health and safety protocols are followed when workers are travelling to the site for their rotation. This implies that health and safety will be implemented off the Project site, while employees are in their communities, travelling to work. In this way, it is expected that health and safety training will also have knock-on benefits in communities as they learn about health and safety from Project employees. Additionally, health and safety training is also done in the Greenlandic and Danish languages (as well as English). It is imperative, however, that employees with different mother tongues are able to adequately communicate with each other to ensure effective implementation of health and safety throughout all Project related activities. Multi-lingual health and safety training is a tool for ensuring that employees fully understand health and safety systems. Training employees in local languages will also make it easier to translate these skills to family and community members who are not part of the Projects workforce. It is hoped that the health and safety culture at the Project will be a driver to improve performance amongst Greenlandic employees and their communities. The implementation of robust health and safety policies may therefore be a benefit of the Project to the overall safety culture of employees, their families and potentially the wider community.

No adverse effects are identified on occupational health and risk of accidents due to Project activities. A number of Project design features have been put in place, and no mitigation additional measures are required. The Project may lead to some benefits to the overall health and safety culture of employees and their families due to the rigorous implementation of a health and safety culture at the work. It is predicted to be a positive impact of low magnitude.

Residual beneficial effects related to local are classified in Section 3.6.

4.4.7 Perceptions of Harm

Key Question: What effect will the Project have on perceptions of harm of the mining industry, in communities in the LSA?

There have been many environmental concerns associated with mining development in Greenland. People are concerned about what they don't understand, and can't see, what may be happening to their environment and to their culture.

Concerns have been raised about mining developments of radioactive elements such as rare earth minerals. People have also raised questions about how non-radioactive tailings will be managed. The tailings from the Project are not radioactive and non-toxic. Their concern is that these materials could lead to contamination of traditional harvested foods including animals, fish, and plants. As discussed elsewhere, the maintenance of traditional diets are important both to cultural integrity and health. The project could lead to a negative effect on perceptions of harm of low magnitude.

The Project will mitigate this effect by providing education to LSA residents, being transparent in results of monitoring activities and establishing a grievance mechanism to address any community concerns. Hudson has held and will continue to hold consultations and public information and education events on anorthosite mining and its risks to people and the environment. Presentation of environmental monitoring results is another avenue to provide people with the information and provide opportunities for questions. Hudson has developed a monitoring plan as part of the SIA process.

Public discussion of the pros and cons of mining developments and eventual policy decisions on the part of regulators will also in the longer term bring to people more confidence in their knowledge of mining development, and consequently less fear should mining proceed. Experiences and lessons learnt from other mining operations in Greenland should also help to reduce the fears about the contamination of traditional foods and build confidence about Project design features in place to protect human health. No residual adverse effect is expected on perceptions of harm relating to Project activities. No mitigation is necessary.

4.5 Cultural and Natural Values

The Project will have direct effects on the cultural and natural values for LSA communities and Greenland, through changes to archaeological resources, changes in access to lands and resource for recreational and commercial use and livelihoods, and changes to nature and landscapes. The Project will also have indirect effects on the cultural and natural values for LSA communities through indirect effects on the quality and availability of natural resources. Cultural and natural values that will be assessed include:

- Cultural heritage;
- Recreational and commercial land and resource use;

- Land and resources for livelihoods; and,
- Nature and landscapes.

4.5.1 Cultural Heritage (Archaeology)

Key Question: What effect will the Project have on cultural heritage, including archaeological resources, in communities in the LSA and Greenland?

An archaeological survey was conducted at the White Mountain (*Qaqortorsuup Kangilia*) site by the Greenland National Museum and Archives (GNMA) in June of 2013 to assess the Project area for culturally significant features. The areas surveyed included the road route, as proposed in 2013, and ten metres on either side of the proposed road, as well as areas immediately south and east of the site of the 2013 exploration activities (Greenland National Museum and Archives, 2013).[6] The survey revealed a number of archaeological features at a total of 11 sites including:

- Double hearth (66V1-00I-095);
- Shooting blind (66V1-00I-096);
- Hunter's bed (66V1-00I-097);
- Circular structure of stones possibly used as a lookout for game (66V1-00I-098);
- Small hunter's bed (66V1-00I-099);
- Cairn made from three stones (66V1-00I-100);
- Cairn made by placing an angular stone on a boulder (66V1-00I-101);
- Fox trap - partially disturbed (66V1-00I-102);
- Tent ring of spaced stones and an associated cache (66V1-00I-103);
- Modern hunting camp with 4 tent houses, a cooking shelter, a tent ring, a play structure and two depots (66V1-00I-104); and,
- Quadrangular tent ring with two other possible tent rings and a cairn (66V1-00I-105).

The archaeological features associated with sites 66V1-00I-103, 66V1-00I-104, 66V1-00I-105 are not protected by the Greenland Conservation Act, 2007 (Greenland National Museum and Archives, 2013).

Only one of the archaeological features, a shooting blind at site 66V1-00I-096, conflicts with the open pit design, as proposed in 2013. According to the Greenland National Museum and

[6] For an illustration of the proposed road route in 2013 with an overlay of the archaeological sites found, see Map 2 of the associated archaeological report (Greenland National Museum and Archives 2013).

Archives (2013), the shooting blind is not a unique archaeological feature. GNMA suggested that it is preferable that the blind is not disturbed, but if redesigning the pit is not possible, destruction of the blind can be considered, as it is not a unique structure. Hudson will take every precaution to protect the blind, and if possible, will move/relocate the blind so that it is not destroyed. Any action on the blind will be discussed with the GNMA prior to any changes to the site.

If it is determined that redesigning the pit to avoid the site is not feasible, the residual impact would be considered low, since the shooting blind, although not a unique feature, would never be replaced.

Chance archaeological finds may occur during both the construction and operation phases of the Project. Archaeological resources may be unearthed during road and/or camp construction and during daily operations associated with mining and camp operation. In order to mitigate the effect of the Project on archeological resources in the instance of chance finds, a chance finds procedure will be developed and implemented prior to the commencement of any Project related activities as described in Sections 2.2 and 2.3. The chance finds procedure will remain in effect for the entire Project lifecycle from construction through to closure.

A potential adverse effect, of low negative significance, is that the archaeological site 66V-001-096 conflicts with the Projects open pit design.

4.5.2 Recreational Land and Resource Use

Key Question: What effect will the Project have on recreational land and resource use in communities in the LSA?

Greenland has a strong tradition of hunting, fishing and natural resource use, which is firmly embedded within the cultural and economic fabric of the country. Land, water and resource use is equally important within the LSA, where residents hunt and fish for recreational, commercial and subsistence purposes. Since the Project will require exclusive access to an area of land for mining, transportation and infrastructure (camp and other buildings) it has the potential to affect land, water and resource use directly by changing access to recreational/natural areas. Specifically, the Project has the potential to affect hunting, fishing, berry picking and other resource gathering activities, as well as tourism.

4.5.2.1 Direct Effects on Hunting

Hunting is an important cultural activity within Greenland and the LSA (Government of Greenland, n.d.). In 2011, there were a total of 2,974 hunters in the LSA, including 2,563 recreational hunters and 411 licenced commercial hunters (Government of Greenland, 2012b). Of these, 1,691 recreational licences and 125 commercial licences were issued to residents of Nuuk, while 872 recreational licences and 286 commercial licences

were issued to residents of the Qeqqata Municipality (Government of Greenland, 2012b).[7] The primary species harvested by recreational and commercial hunters within the LSA are muskox and caribou (pers. comm. Kangerlussuaq Settlement Council, 2012; pers. comm. Sisimiut Hunters and Fishers, 2012; pers. comm. Sarfannguit Settlement Council, 2012; pers. comm. Itilleq Settlement Council, 2012; pers. comm. Maniitsoq Hunters and Fishers, 2012). The Municipality of Qeqqata issued 97 recreational and 15 commercial hunting licenses for muskox in 2014 (Qeqqata Municipality, 2013). Separate licencing data for caribou hunting is not available.

Hunting for muskox and caribou occurs throughout the LSA. Robinson Bay, on the far side of the fjord, 33 km northeast of the Project port location, is a particularly important hunting area. People travel throughout the LSA to hunt in the area, particularly during August and September (pers. comm. Kangerlussuaq Hunters and Fishers, 2012; pers. comm. Kangaamiut Settlement Council, 2012; pers. comm. Napasoq, 2012). Residents of Itilleq and Sisimiut hunt for caribou in the Aussivit Valley in the Itilleq Fjord west of the Project's License area (stakeholder-engagement, 2013). The area around Kangerlussuaq is also very important for hunting for caribou and muskox (pers. comm. Maniitsoq Hunters and Fishers, 2012). The Paradise Valley also used to be an important area for hunting muskox and caribou however the area is now protected and currently off limits for human use (pers. comm. Kangaamiut Settlement Council and Hunters and Fishers, 2012). Hunting for both muskox and caribou also occurs in the vicinity of the Project's License area (pers. comm. Kangerlussuaq Settlement Council, 2012; pers. comm. Itilleq Settlement Council, 2012; pers. comm. Maniitsoq Hunters and Fishers, 2012; pers. comm. Napasoq Settlement Council, 2012). Residents from Kangerlussuaq report hunting both musk ox and caribou in the Project area and reportedly harvested at least four musk ox and several caribou last season (pers. comm. Kangerlussuaq Settlement Council, 2012). The Project area is also used for trophy hunting (pers. comm. Maniitsoq Town Council, 2012).

The Project has the potential to affect both recreational and commercial hunting activities in the LSA and Project area by affecting access to areas used for hunting. The Project will require exclusive access to an area of land for mining, transportation and infrastructure (camp and other buildings). This land will not be available for hunting activities or the establishment of hunting camps during the construction phase or the 20+ year life cycle of the mine. The impact that the removal of this land will have on recreational and commercial hunting activities within the LSA is negligible, since there is an abundance of land and other areas available to hunters that will not be affected by the project, including Robinson Bay, the area around Kangerlussuaq and the Aussivit Valley along the Itilleq Fjord. The Project will have an effect on recreational and commercial hunting activities in the immediate vicinity of the Project area since there are hunters from Kangerlussuaq who currently access the area to hunt muskox and caribou, however the effect of the Project on hunting in the immediate vicinity will be

[7] For a breakdown of the distribution of recreational and commercial hunting licenses amongst the towns of the Qeqqata Municipality, refer to Section 5.4.1.

negligible since there are low population densities of both caribou and muskox in the Project area, and as a result, only a few hunters visit this area (stakeholder-engagement, 2013). There are also many other areas of similar or better quality that are alternatively available to hunters. The effect of the Project on hunters who have established hunting camps in the vicinity of the Project is also negligible, since hunting camps in the area are currently abandoned (pers. comm. Kangerlussuaq Settlement Council, 2012).

There are no residual adverse effects predicted on hunting due to Project activities. No additional mitigations are required.

4.5.2.2 Direct Effects on Fishing

Fishing is an important cultural activity within Greenland and the LSA (Government of Greenland, n.d.). Fishing in Greenland and the LSA occurs both on and offshore, and includes all types of fishing from large scale commercial fishing to recreational, artisanal and sport fishing. Important fish species in the LSA include arctic char, cod, lump fish, wolfish, flounder, and salmon (pers. comm. Sisimiut Hunters and Fishers, June 15th 2012; pers. comm. Napasoq Settlement Council, 2012; pers. comm. Atammik Settlement Council and Hunters and Fishers, 2012). This portion of the assessment will focus on the effects of the Project on inshore fishing within the LSA.

Inshore fishing occurs throughout the LSA in both the Itilleq and Kangerlussuaq fjords and in many of the rivers flowing into the Kangerlussuaq fjord (pers. comm. Kangerlussuaq Hunters and Fishers, 2012, pers. comm. Sisimiut Hunters and Fishers, 2012; pers. comm. Itilleq Hunters and Fishers, 2012; pers. comm. Sarfannguit Settlement Council, 2012; pers. comm. Kangaamiut Settlement Council and Hunters and Fishers, 2012, pers. comm. Maniitsoq Hunters and Fishers, 2012). Robinson Bay is a particularly important fishing location, especially during the months of July and August, and residents from several of the towns and settlements within the LSA travel there to fish (pers. comm. Kangerlussuaq Hunters and Fishers, 2012; pers. comm. Sisimiut Hunters and Fishers, 2012; pers. comm. Itilleq Hunters and Fishers, 2012; pers. comm. Kangaamiut Settlement Council and Hunters and Fishers, 2012; pers. comm. Maniitsoq Hunters and Fishers, 2012). Some fishing also occurs across the fjord from the Robinson Bay near the Project site, and south of the bay, where the Paradise Valley joins the Kangerlussuaq fjord (pers. comm. Kangaamiut Settlement Council and Hunters and Fishers, 2012). Residents of Maniitsoq also fish further up the Kangerlussuaq fjord, closer to Kangerlussuaq and inland from the fjord (pers. comm. Maniitsoq Hunters and Fishers, 2012). Residents of Itilleq and Sisimiut also fish in the Itilleq Fjord in the Aussivit Valley and near the Project site (pers. comm. Itilleq Hunters and Fishers, 2012).

Fishing in the Kangerlussuaq fjord and the rivers flowing into the fjord, as well as the Aussivit Valley of the Itilleq Fjord is primarily for arctic char (pers. comm. Napasoq Settlement Council, 2012; pers. comm. Kangerlussuaq Hunters and Fishers, 2012; stakeholder-engagement, 2013). Fishing in the Robinson Bay area is also mainly for char (pers. comm. Sisimiut Hunters and Fishers, 2012; pers. comm. Maniitsoq Hunters and Fishers, 2012). Fishing in the Robinson Bay area is conducted primarily with stationary gill nets, however

fishing rods are also used (pers. comm. Sisimiut Hunters and Fishers, 2012; pers. comm. Maniitsoq Hunters and Fishers, 2012). There are catch limits for fishing with gillnets but not for fishing with rods (pers. comm. Itilleq Hunters and Fishers, 2012).

The Project has the potential to affect both recreational and commercial fishing activities in the LSA and Project area by affecting access to areas used for fishing. The Project will require exclusive access to an area of shoreline for transportation infrastructure (floating dock) and haul ships. This area will not be available for fishing activities during the 20+ year life cycle of the mine. The impact that the removal of this portion of shoreline will have on recreational and commercial fishing activities within the LSA is negligible, since popular fishing areas including the Robinson Bay, areas around the Paradise Valley and Kangerlussuaq, and areas within the Itilleq Fjord including the Aussivit Valley will continue to be available to fishermen and will not be affected by the Project.

The Project will affect fishing activities in the waters in the immediate vicinity of the Project area since industrial operations associated with mooring and loading boats will alter this area during the 20+ year operation phase of the mine. Although fisher people will not be restricted from accessing this area, and some fishing reportedly takes place within the vicinity of the Project area, the effect of the Project on fishing in the waters in the immediate vicinity of the Project area will be negligible since the area is only used sporadically for fishing and there are many alternative areas for fishing along the Kangerlussuaq Fjord and surrounding areas.

Hudson is proposing to allow fishermen the opportunity to sell their catch directly to the project at the port facility where there will be a radio/phone to contact the camp manager and cook. This approach has been discussed with all of the communities and professional fishermen Hudson met with during community consultations and was very well received.

There are no residual adverse effects predicted on fishing due to Project activities, and it is expected the project will actually increase the opportunities for fishermen to sell their catch locally. No additional mitigations are required.

4.5.2.3 Indirect Effects on Hunting and Fishing

The Project has the potential to indirectly affect recreational and commercial uses of land, water and resources within the LSA as a result of the effects of dust, and noise on wildlife, fish, and vegetation. Dust and noise could affect the quality and availability of resources targeted by resource users including hunters and fisher people as described herein. The Project also has the potential to affect recreational and commercial uses of land and resources within the LSA by affecting the use of ATV's and snowmobiles used to physically access to lands and resources within the LSA and Project area.

Dust from mining activities has the potential to indirectly affect hunting and plant based resource harvesting activities within the LSA by affecting the quality and availability of resources. Dust could potentially impact the quality and availability of plants used by game species such as caribou and muskox, which could potentially cause game species to forage

in other areas unaffected by dust. Potential changes in the foraging locations of game species could affect the success of hunting activities within the LSA by decreasing opportunities for hunters to encounter game or by causing hunters to increase hunting effort in areas where they are less familiar with the landscape and behavior of game. Dust dispersal is expected be small with a relatively local extent (Hudson Resources Inc. n.d.). Therefore, if proposed mitigation measures are implemented and mining activities are carried out in accordance with good environmental practice, then the effects of dust on the quality and availability of resources and especially vegetation within the LSA are expected to be negligible (see Section 7.1.5 Dust Assessment, EIA). Subsequently, the effect that dust will have on hunting and plant based resource harvesting activities within the LSA is also expected to be negligible.

Noise from mining activities, including blasting, crushing and generators has the potential to indirectly affect hunting activities within the Project Area by affecting the availability of resources. Noise could potentially scare away game species such as caribou and muskox and potentially cause game species to seek out other areas unaffected by noise. Potential changes in the availability of game species could affect the success of hunting activities within the LSA by decreasing opportunities for hunters to encounter game or by causing hunters to increase hunting effort in areas where they are less familiar with the landscape and behavior of game. The effects of noise on wildlife, and applicable mitigations, are discussed in Section 7.1.4 Noise Assessment in the EIA.

The use of ATV's and snowmobiles is controversial within the LSA. There are strict municipal regulations that govern the use of ATV's and snowmobiles for hunting within the Qeqqata Municipality. The use of ATV's and snowmobiles is permitted along accepted travel corridors for the transportation of equipment and catch/kill, however the use of motorized vehicles is strictly prohibited for all activities related to the pursuit or capture of game animals (pers. comm. Qeqqata Municipal Police, 2012; Government of Greenland 2013, pers. comm. Kangaamiut Settlement Council and Hunters and Fishers, 2012).

Some hunters do use ATV's despite regulations while others adhere strictly to the rules out of concern for the natural environment and the effects ATV's have on the groundcover (pers. comm. Kangaamiut Settlement Council and Hunters and Fishers, 2012; pers. comm. Maniitsoq Hunters and Fishers, 2012). Others use snowmobiles only during the winter months when the effects to vegetation are minimized (pers. comm. Maniitsoq Hunters and Fishers, 2012). In order to respect municipal legislation regarding the use of ATV's and snowmobiles, the Qeqqata Municipal Police recommend that Hudson be diligent in enforcing a policy of no unauthorized motorized vehicles on the Project road in accordance with Municipal regulations. The Qeqqata Municipal Police also highlighted the risk that individuals "may want to hitchhike on Hudson's trucks and other vehicles" in order to access lands adjacent to the Project area (pers. comm. Qeqqata Municipal Police, 2012).

The Project has the potential to indirectly affect recreational and commercial uses of land and resources within the LSA by affecting physical access to lands and resources within the LSA and Project area. The Project will involve the construction of approximately 10 km of road

required for the transportation of crushed material from the mine site to the port facility (Hudson Resources., n.d.b). Although the road will be off limits for non-project use, the road could potentially increase physical access to lands and natural areas and facilitate greater ease of access to these areas, which in turn could affect the productivity of hunting and other resource gathering activities. In order to respect municipal legislation and mitigate the effects of the Project on access to resources, the Project will put in place the following mitigations:

- enforce a policy that prohibits unauthorized persons / vehicles from travelling on Project roads;
- enforce policy that prohibits unauthorized persons from riding in vehicles owned and operated by Hudson Resources Inc.; and,
- develops a 'Motorized Vehicles Policy" for the project road in accordance with Municipal regulations.

If these policies are administered and enforced effectively, the effect of the Project on physical access to lands and resources within the LSA will be negligible.

There are no residual adverse effects predicted for indirect effects on hunting and fishing due to Project activities. No additional mitigations are required

4.5.2.4 Effects on Other Land and Resource Uses

Other land and resource uses within the LSA include berry picking, plant collection, soapstone collection and tourism (discussed in Section 3.5.2.5). Residents of Sisimiut harvest blueberries, blackberries and Angelica in the Project area, while residents of the LSA gather soapstone at the head of the Itilleq Fjord (pers. comm. Sisimiut Hunters and Fishers, 2012; pers. comm. Qeqqata Municipal Police, 2012).

The Project has the potential to affect berry picking and plant collection activities in the LSA by affecting access to areas used to collect these resources. The Project will require exclusive access to an area of land for mining, transportation and infrastructure (camp and other buildings). This land will not be available for berry picking or plant collection activities during the 20+ year life cycle of the mine. The impact that the removal of this land will have on berry picking and plant collection in the LSA is negligible, since there is an abundance of land and naturalized areas available to berry pickers and plant harvesters throughout the LSA. The Project will not affect soapstone collection activities since the area where these activities occur is well outside of the Project's footprint.

There are no residual adverse effects predicted on other land are resource uses due to the Project. No additional mitigations are required

4.5.2.5 Effects on Tourism

Tourism is becoming increasingly important to Greenland's economy and several LSA communities, including Kangerlussuaq, Maniitsoq, Nuuk, and Sisimiut have been earmarked as national tourist destinations by Greenland's tourism industry (Visit Greenland, n.d.,a,b,c,d.; pers. comm. Kangerlussuaq Hunters and Fishers, 2012). Tourism within Greenland and the

LSA is largely focused on outdoor recreational activities and wilderness experiences including hiking, hunting and fishing, snowmobiling, dog sledding, kayaking, and wildlife observation (Visit Greenland n.d.,a,b,c,d.). Tourist visits to Greenland typically peak during the months of July and August (Statistics Greenland, 2012c).

The Sisimiut Business Council currently has an agreement to develop tourism within the Qeqqata Municipality and the community of Atammik is also exploring tourism related initiatives (pers. comm. Sisimiut Business Council, 2012; pers. comm. Atammik, 2012). The Kangerlussuaq and Kangaamiut Settlement Councils have recently expressed interest in developing the tourism potential of the ice caps near Kangerlussuaq and the Paradise Valley, located 83 km southwest of the Kangerlussuaq International Airport (pers. comm. Kangerlussuaq Settlement Council, 2012; pers. comm. Kangerlussuaq Hunters and Fishers, 2012; pers. comm. Kangaamiut Settlement Council, 2012). According to the Kangaamiut Settlement Council and Hunters and Fishers (pers. comm., 2012) tourist related sometimes hiking takes place in the vicinity of the Project.

The Project has the potential to affect both tourism initiatives and tourist related activities in the LSA and Project area. The Project will require exclusive access to an area of land for mining, transportation and infrastructure (camp and other buildings). This land will not be available to the Municipality for the development of tourism related initiatives, nor will it be available to tourists visiting the area to hike, view wildlife or participate in similar tourist related activities during the 20+ year life cycle of the mine. The impact that the removal of this land will have on the development of tourism related initiatives within the LSA is negligible, since the vast majority of the LSA land base consists of natural/wilderness terrain, and since the area removed for the mine and associated mining activities is not a highly used tourist area. The Project will affect current hiking activities in the area, however the impact of this affect is expected to be low since the area used for the mine and associated mining activities is not used extensively for hiking.

There are no adverse residual effects predicted on tourism due to the Project. No additional mitigations are required.

4.5.3 Land and Resource Use for Livelihoods

Key Question: What effect will the Project have on land and resource use for livelihoods in communities in the LSA?

Hunting and fishing play an important role in the livelihoods and local economies of residents within Greenland and the LSA (Government of Greenland, n.d.). Approximately 10% of Greenland's workforce is employed in the hunting industry, either directly, as commercial hunters, or indirectly, through employment at meat processing facilities (Government of Greenland, n.d.,a.). Professional hunters and fisher people must be able to demonstrate that at least 50% of their income comes from professional hunting and fishing in order to maintain a commercial hunting licence (pers. comm. KNAPK, 2012).

The Project has the potential to affect the livelihoods and local economies of LSA communities. The Project will create a demand for locally sourced meat and fish which could

have a positive impact on the livelihoods of commercial hunters and fishermen from LSA communities, if proper infrastructure was in place to facilitate the processing, storage and provision of local meat and fish. Conversely, the Project could also have a negative impact on commercial hunters/fisher people from the LSA if hunters/fishermen accept work in the mine and as a result are no longer able to maintain their status as professional hunters/fishermen.

Project-induced changes in infrastructure associated with the sale of commercially harvested meat and fish such as abattoirs and meat/fish processing facilities could indirectly benefit livelihoods and local economies of LSA communities by increasing the opportunities available to commercial hunters/fishermen to sell their catch. These benefits are discussed in detail in the procurement section of the Economic Effects Assessment (see Section 3.1).

Hunting and fishing also plays an important role in the subsistence practices of LSA residents since most commercial and recreational harvesters hunt and fish to feed themselves and their families (pers. comm. Sisimiut Hunters and Fishers, 2012). A large portion of the diets of some LSA communities, including Sisimiut and Sarfannguit come from country foods including muskox and caribou (pers. comm. Sisimiut Hunters and Fishers, 2012; pers. comm.; Sarfannguit Settlement Council, 2012). Subsistence hunting and fishing practices contribute extensively to the social fabric of tightly knit LSA communities whose residents frequently gather to share country foods and cultural knowledge (True North Gems Inc., 2009).

The Project has the potential to affect the subsistence hunting and fishing practices within LSA communities. The potential for increased participation in the wage the economy could also have a negative impact on the subsistence practices of hunters in the LSA who will have less available time to participate in hunting activities. This in turn affect could have a negative effect on the social fabric of LSA communities by altering residents relationships to the land, each other and the natural resources contained therein. The relatively low employment levels of the Project are not however expected to substantially change people's relationship to the land. Rotational schedules may also provide people with a sufficient amount of time to continue to hunt, fish and harvest resources when they are not on a rotation. In order to further mitigate the potential effect that increased participation in the wage economy could have on LSA resident's relationships to the land, each other and the natural resources it is recommended that the Project:

- Incorporates socio-cultural values and traditions into the workplace culture where possible (including making traditional food available); and,
- Supports municipal programming aimed at promoting important socio-cultural activities within the LSA, including fishing, hunting, handcraft and the transfer of traditional knowledge.

There are no adverse residual effects predicted on land, resource use and livelihoods due to Project activities. No additional mitigations are required.

4.5.4 Nature and Landscapes

Key Question: What effect will the Project have on nature and landscapes in the LSA?

There are several protected and culturally important areas within the LSA including the Paradise Valley, Robinson Bay, and several ecologically sensitive areas.[8] The Project will not affect these areas since they are all located outside of the Project's footprint.

The Project site is located in a coastal area in the Kangerlussuaq fjord. The topography of the Project site consists of rolling hills between 450 m and 560 m in elevation that are dissected by a large number of lakes, brooks, and intermittent streams. The Project site is adjacent to the White Mountain, or *Qaqortorsuaq* as it is known to local residents, which reaches and elevation of 1,300 m (Knudsen et al. 2012).

Mining activities will permanently change the landscape of the Project site. An open pit mine will be created by benching into the hillside and a sinking cut will be made in approximately year ten of operations (Hudson Resources., n.d.b). Changes to the landscape as a result of the Project will be permanent and irreversible.

Very little to no waste rock will be created as a result of both the nature of the anorthosite deposit and the mining technique (Hudson Resources., n.d.b). Therefore it is not anticipated that waste rock will have any effect on the natural landscape at the Project site. The project will develop a closure and reclamation plan that addresses how nature and landscapes will be reclaimed.

There are no adverse residual effects predicted on nature and landscapes due to Project activities outside of the footprint. No additional mitigations are required.

4.6 Residual Effect Classification

4.6.1 Economy

The beneficial effect of the Project on the economy in the LSA and in Greenland is predicted to be of low impact during the construction phase, and moderate impact during operations as capacity is created for local employment, procurement and fiscal benefits accrue to Greenland. Employment and procurement benefits will accrue to a small proportion of the population of Greenland. The diversification of the Greenlandic economy and fiscal benefits will provide benefits to the entire country over the duration of the Project.

A residual beneficial effect is predicted.

[8] For more detail on the protected areas located with the LSA see section 3.4.3.

4.6.2 Education and Training

The beneficial effect of the Project on workforce skills development is predicted to be of low impact, because a material, perceptible benefit to social conditions will accrue to a small proportion of the population of Greenland.

A residual beneficial effect is predicted.

4.6.3 Public Infrastructure, Services and Economic Development

The effect of the Project on physical infrastructure is expected to be small and have no effect on overall capacity due to low levels of Project induced population change. Residential housing availability in Sisimiut may experience low levels of increased pressure, however the Projects will clearly advertise its hiring strategy and implement pick-up points to discourage movement towards the Project, which is expect to mitigate any negative effects on residential housing in the LSA. The Project is not expected to have an effect on social infrastructure or planned development.

No residual adverse effects are predicted.

4.6.4 Social and Health Effects

The effect of the Project on demographic and population characteristics is expected to be negligible due to the relatively low level of direct employment, the Project's focus on hiring from the LSA and measures that will be put in place to limit Project induced in-migration.

The Project will not require any land acquisition. There is also not likely to be any measurable level of economic displacement. Some harvesters may lose access to land previously accessed in the Project site, however, there are many alternative areas for harvesting in the LSA that can be accessed and therefore the effect will be negligible.

There are no negative effects predicted on community well-being from the Project. Increased incomes may be drivers of both increased well-being, and potentially of negative social outcomes such as substance misuse and/or increased crime. The Project will put in place employee and family assistance programs and life skills training to provide the necessary support mechanisms and capacity to assist employees and their families. There is no adverse negative effect predicted to community well-being or cohesion.

Negative effects are also not expected to physical and mental health. The Project will put in place mitigations to address any negative social behaviors that may lead to mental health issues such as substance misuse. The Project will not negatively affect the prevalence of communicable or non-communicable diseases, and the Project's emphasis on health and safety may increase the safety culture of employees and their families.

No residual adverse effects are predicted.

4.6.5 Cultural and Natural Values

The direct effect on hunting and fishing due to Project activities will be negligible. Although hunters and fisher people will be restricted from using the Project area, there use rates in the Project area have been historically low and there are many alternative locations for hunters and fishers to use. The Project is also not expected to affect plant harvesting, berry picking or tourism potential as there is an abundance of alternative areas to undertake these activities.

The Project has the potential to indirectly affect recreational and commercial uses of land, water and resources within the LSA as a result of the effects of dust, and noise on wildlife, fish, and vegetation. The Project will implement mitigations to avoid or eliminate these effects, including ongoing monitoring. The Project has also put in place a motorised vehicle policy that restricts access for unauthorised vehicles to use the Project road, therefore eliminating the possibility of increased access to hunting and fishing grounds in the Project area and LSA.

The Project has the potential to both positively and negatively affect the livelihoods and local economies of LSA communities. The Project will create a demand for locally sourced meat and fish which could have a positive impact on the livelihoods of commercial hunters and fisher people from LSA communities. It could also draw people from that sector to accept work in the mine and as a result are no longer able to maintain their status as professional hunters/fisher people. The relatively low employment levels of the Project are not however expected to substantially change people's relationship to the land. Rotational work schedules should also enable people to have sufficient time to harvest the land. The Project is, therefore, expected to have a negligible effect on the livelihoods of hunters and fisher people.

Mining activities will permanently change the landscape of the Project site. The Project will develop a closure and reclamation plan that addresses how nature and landscapes will be reclaimed. No residual adverse effects are predicted.

4.7 Monitoring and Follow-up

4.7.1 Economy

Follow-up monitoring is required to verify the predictions that the majority of the workforce will sourced from within Greenland, and that there are business opportunities for Greenlandic businesses to supply the Project with goods and services.

4.7.2 Education and Training

Follow-up monitoring is required to verify the predictions that the majority of the workforce will sourced from within Greenland, and that skills training and development will be provided to these Greenlandic workers.

4.7.3 Public Infrastructure, Services and Economic Development

Follow-up monitoring is required to verify and effects on physical and social infrastructure from direct and indirect Project activities. Monitoring activities will take place with key

informants including governmental organisations and service providers at regular intervals, established in the Monitoring Plan.

4.7.4 Social and Health Effects

Follow-up monitoring is required to verify and effects on population and demographics, the well-being and health of employees, their families and communities. Monitoring activities will take place through census information, employee surveys, key informants interviews with health providers, municipal and other governmental organisation at regular intervals. These will be established in the Monitoring Plan.

4.7.5 Cultural and Natural Values

Follow-up monitoring is required to assess the effectiveness of the Chance Finds Procedure and the Motorized Vehicle Policy. The Project will also monitor the total number of recreational and commercial hunting licenses issued in the LSA over the life cycle of the Project. The Project will also engage with hunting, fishing and harvesting organisations to monitor perceptions of Project effects (dust, noise etc..) on wildlife, fish and vegetation. They will also hold key informant interviews with the municipality LSA residents and Hudson employees (of Greenlandic descent) to assess the perception of effects of increased participation in the wage economy (socio-cultural activities, hunting, fishing, handcraft, social cohesion and the transfer of traditional knowledge).

4.8 Impact Assessment Summary

Table 10 provides a summary of the impact assessment results for each assessment indicator.

Table 10: Impact Assessment Summary

Assessment Indicator	Likely Effect	Direction	Magnitude	Duration	Extent	Mitigation/Enhancement	Residual? (Y/N)	Residual Effect Classification
Employment	Direct, indirect and induced employment	Positive	Low	Long-term	NSA	■ 50% of construction workforce Greenlandic ■ 80% of operation workforce Greenlandic ■ Contractor selection will include% of Greenlandic hires	Y	Low positive
Local Procurement	Purchase of food, fuel, and services from local businesses	Positive	Low	Long-term	NSA	■ Establish detailed procurement lists and make them publically available ■ Purchase traditional foods from local hunters and fisher people	Y	Low positive
Economic Growth and Diversification	Diversification of Local and National Economy	Positive	Low	Long-term	NSA	■ No mitigations identified	Y	Low positive
Employment Incomes	Increased incomes for Project employees	Positive	Low	Long-term	NSA	■ No mitigations identified	Y	Low positive
Taxation Effects	Revenues from corporate and personal taxes	Positive	Low	Long-term	NSA	■ No mitigations identified	Y	Low positive
Workforce Skills Development	Skills development for Project employees	Positive	Low	Long-term	NSA	■ Establish workforce training programs 6 months prior to the beginning of mining operations	Y	Low positive
National and Local Education	Increase in education levels in the LSA and across Greenland	Positive	Negligible	Long-term	NSA	■ Work with educational institutions to develop curriculum and requisite skills for employment with Project	N	Negligible
Physical Infrastructure	Additional demand on physical infrastructure	Negative	Negligible	Medium-term	LSA	■ No mitigations identified	N	Negligible

Table 10: Impact Assessment Summary

Assessment Indicator	Likely Effect	Direction	Magnitude	Duration	Extent	Mitigation/Enhancement	Residual? (Y/N)	Residual Effect Classification
Social Infrastructure	Additional demand on social infrastructure, particularly housing	Negative	Low	Medium-term	LSA	■ Clearly communicate local hiring targets to prevent people moving to the LSA ■ Establish designated pick-up points so employees do not need to relocate to LSA ■ Construct a permanent, fully catered camp to house employees	N	Negligible
Pressure on Planned Developments	Effect on planned developments	Negative	Negligible	Medium-term	LSA	■ No mitigations identified	N	Negligible
Demographics and Population	Change in demographic and population profile	Negative	Low	Long-term	LSA	■ Prioritise hiring qualified people in LSA ■ Establish designated pick-up points so employees do not need to relocate to LSA ■ Clearly publish employment requirements on website and with local employment support centres in LSA and Greenland ■ Monitor population changes in the towns and settlements of the Qeqqata Municipality	N	Negligible
Land Acquisition and Displacement	Decreased availability of land for habitations and economic activity	Negative	Negligible	Long-term	LSA	■ No mitigations identified	N	Negligible
Community Well-being	Change in the well-being and cohesion of project employees, their families and communities	Negative	Low	Long-term	NSA	■ Implement life skills training programs ■ Establish an employee and family assistance program	N	Negligible

Table 10: Impact Assessment Summary

Assessment Indicator	Likely Effect	Direction	Magnitude	Duration	Extent	Mitigation/Enhancement	Residual? (Y/N)	Residual Effect Classification
Physical and Mental Health	Changes in the physical and mental health of project employees, their families and communities	Positive / Negative	Negligible	Long-term	NSA	■ Make traditional foods available to Greenlandic employees at site ■ Establish a zero tolerance policy for drugs and alcohol at site and during travel to site ■ Establish an employee and family assistance program	N	Negligible
Environmental Impact	Changes to availability of resources for hunting for LSA residents	Negative	Low	Long-term	LSA	■ No mitigations identified	Y	Low Negative
Occupational Health and Risk of Accidents	Risk to LSA residents and employees of health issues and accidents	Negative	Moderate	Long-term	LSA	■ Develop health, safety and environment policy ■ Health and safety training for all project ■ Regular inspection and maintenance of Project infrastructure ■ Securing all Project facilities with the potential to poser worker and public health and safety risks ■ Undertaking health and safety training in Greenlandic, Danish and English ■ Establishing in-house health and safety capabilities including having a nurse on site	N	Negligible
Perceptions of Harm	Changes to community perceptions of health of the natural environment and food security	Negative	Low	Long-term	LSA	■ Provide education to LSA residents on anorthosite mining, ■ Disclose results of monitoring activities ■ Establish a grievance mechanism	N	Negligible

Table 10: Impact Assessment Summary

Assessment Indicator	Likely Effect	Direction	Magnitude	Duration	Extent	Mitigation/Enhancement	Residual? (Y/N)	Residual Effect Classification
Cultural Heritage (Archaeology)	Changes to the cultural heritage of the LSA, including removal of shooting blind	Negative	Low	Long-term	LSA	■ Coordinate any proposed changes to the shooting blind (66V1-00I-096) with the Greenland National Museum and Archives ■ Establish a chance finds procedure	Y	Low Negative
Recreational Land and Resource Use	Indirect effect from dust, noise and increased access to project area on hunting, fishing and harvesting activities	Negative	Low	Long-term	LSA	■ Implement mitigations identified in the Dust Assessment ■ Implement mitigations identified in the Noise Assessment ■ Implement a policy to stop access on the Project road to LSA residents ■ prohibit pick-up of unauthorised people in Project vehicles	N	Low Negative
Land and Resource Use for Livelihoods	Increased opportunity to sell hunted and fished goods to the Project Incentive to leave commercial hunting and fishing activities for employment opportunities at the Project	Positive / Negative	Low	Long-term	LSA	■ Make traditional foods available to Greenlandic employees ■ Support municipal programming aimed at promoting important socio-cultural activities within the LSA (i.e., fishing, hunting, handcraft, transfer of TK)	N	Negligible
Nature and Landscapes	Permanent change to nature and landscapes in the Project area	Negative		Long-term	LSA	■ Develop a closure and reclamation plan	N	Negligible

5.0 ANALYSIS OF ALTERNATIVES

The following section outlines potential alternatives to the proposed Project plans. Two Project alternatives have been identified. They are the Project case, as described in the Project description and the No Project case.

Project alternatives are limited due to the Project location, the small Project size and lack of existing infrastructure. There are no alternatives for the location of the mine. The mine location that has been selected has the quality and consistency of anorthosite required for the end users (Hudson Resources Inc. n.d. c).

Several alternatives were reviewed for the location of the processing plant. By grouping the port, accommodation and process plant facilities, it reduced the area of impact by consolidating structures in one location. It also limited the amount of travel by roads that workers will require to travel to and from work each day.

The selection of the Sondrestrom Fjord for the port location was based on technical, environmental and social parameters. Construction of the port on the Itilleq Fjord, another alternative, would entail the construction of a road twice as long in length to the current proposed road. In addition, the Itilleq Fjord is shallow and not amenable to a port facility. Importantly, consultation with local stakeholders revealed that the Itilleq Fjord is widely used for hunting and fishing and a port at this site would potentially have negative social impacts. The Sondrestrom fjord was selected on this basis (Hudson Resources. n.d. c).

With regard to social effects, the analysis of the Project case also considered 1) the benefits to local communities and 2) to benefits from fiscal revenues to the Government of Greenland.

Benefit to local communities from the Project case may include:

- Opportunities for employment and business opportunities;
- Diversification of the local economy, including synergies with other economic sectors including oil and gas, construction and tourism industries; and,
- Opportunities for education and training with the Project.

Benefits to local communities from the no Project case may include:

- No risk of negative social pathologies or impacts related to the Project;
- No restriction to access to natural areas related to the Project; and,
- No risk of changes to traditional livelihoods related to the Project.

Benefits to the Government of Greenland from the Project case may include:

- Fiscal revenues (including taxes and royalties);
- Skills development of the Greenlandic workforce; and,

- Increased profile of the Greenlandic mining industry.

Benefits to the Government of Greenland from the no Project case may include:

- No benefits have been identified.

6.0 MONITORING AND EVALUATION PLAN

The Monitoring and Evaluation Plan will provide a framework to assess changes to the baseline environment over time. The Monitoring and Evaluation Plan is in conformance with MLSA requirements (BMP, 2009) and includes:

1) An outline of the monitoring methodologies to be applied to measure progress against commitments and goals;
2) Well defined indicators for each of the identified impacts and benefits in the Social Impact Assessment (SIA), including:
    a. Economic effects;
    b. Education and training;
    c. Public services and economic development;
    d. Social and health effects; and
    e. Cultural and natural values.
3) Frequency and submission of monitoring results to MLSA; and,
4) Provide an estimation of human resources required to undertake the monitoring program.

Table 11: Monitoring and Evaluation Plan

Social Parameter	SIA Commitment	Monitoring Method	Frequency	Reporting and Submission of Monitoring Results:	Responsibility
Economic Effects	■ 50% Greenlandic workforce during construction ■ 80% Greenlandic workforce during operation phase	■ Monitor Greenlandic employment levels at the Project; ■ Monitor the effectiveness of the hiring strategy, and how it has been communicated to LSA residents, employment centres and educational and training institutions; ■ Work with educational institutions to monitor the number of graduates that are qualified with skills that are required for project activities; ■ Monitor the effectiveness of workforce education and training programs, including the number of employees that have been able to advance job positions	■ Bi-annual monitoring during the construction phase and first 3 years of operations; annual monitoring for the remainder of operations phase and closure phase	■ MLSA and other relevant government agencies (i.e., human resources and economic development) ■ Relevant stakeholder groups (e.g., including labour associations and educational institutions)	■ Hudson Resources Human Resources Manager
	■ Local procurement of: ▪ Local contractors and services providers ▪ Food supplies (incl. traditional foods) ▪ Fuel ▪ Transportation ▪ Miscellaneous Equipment (spare parts, clothing, safety equipment etc.)	■ Monitor expenditure by category on local procurement ■ Track if local business opportunities are expanding due to Project activities (growth of mining industry in Qeqqata Municipality)	■ Monthly internal reporting on local procurement levels by category ■ Annual reporting to external stakeholders	■ MLSA and other relevant government agencies (i.e., economic development) ■ Relevant stakeholder groups (e.g., including hunters and fishers associations, industry associations)	■ Hudson Resources Stakeholder Relations Manager

Table 11: Monitoring and Evaluation Plan

Social Parameter	SIA Commitment	Monitoring Method	Frequency	Reporting and Submission of Monitoring Results:	Responsibility
	■ Employee incomes are on par with industry standards for Greenland	■ Monitor wage levels by skill type for Project employees to ensure that they are in line with comparable industries in Greenland.	■ Annual monitoring and salary reviews	■ MLSA and other relevant government agencies (i.e., economic development) ■ Relevant stakeholder groups (e.g., employees, labour associations, industry associations)	■ Hudson Resources Human Resources Manager
	Evaluation Process and Adaptive Management Strategies				
	■ Hudson Resources will regularly evaluate if it is achieving commitments outlined in the Social Impact Assessment (SIA) and the efficacy of its monitoring programs. If economic commitments are not being achieved, Hudson Resources will re-evaluate if targets are achievable and the effectiveness of implementation and/or mitigation strategies to reach the expected economic benefits of the Project. The Project will undertake all evaluation in consultation with relevant government agencies and stakeholder.				
Education and Training	■ Establish local training initiatives	■ Monitor the effectiveness of workforce education and training programs through training retention and graduation rates	■ Bi-annual monitoring during construction and the first three years of operation ■ Annual monitoring during the remainder of the operation phase	■ MLSA and other relevant government agencies (i.e., those responsible for education and workforce development) ■ ■ Relevant stakeholder groups (e.g., employees, labour associations, post-secondary institutions)	■ Hudson Resources Stakeholder Relations Manager
	Evaluation Process and Adaptive Management Strategies				
	■ Hudson Resources will regularly evaluate if it is achieving commitments outlined in the Social Impact Assessment (SIA) and the efficacy of its monitoring programs. If training objectives are not being achieved, Hudson Resources will re-evaluate if training targets are achievable and assess the implementation strategies being employed to reach the expected training benefits of the Project. The Project will undertake all evaluation in consultation with employees, government agencies and other relevant stakeholders.				

Table 11: Monitoring and Evaluation Plan

Social Parameter	SIA Commitment	Monitoring Method	Frequency	Reporting and Submission of Monitoring Results:	Responsibility
Public Infrastructure, Services and Economic Development	■ Minimize pressures on permanent housing	■ Monitor annual housing statistics published by Statistics Greenland ■ Monitor the number of Project employees occupying permanent housing in Qeqqata Municipality as a result of the Project	■ Annual monitoring during the construction and operation phase	■ MLSA and other relevant government agencies (i.e., agency responsible for housing, municipality)	■ Hudson Resources' Stakeholder Relations Manager
	■ Minimize pressures on temporary accommodations	■ Monitor employee usage of local temporary accommodations ■ Work with local temporary accommodation providers to monitor temporary accommodation vacancy rates	■ Annual monitoring during the construction and operation phases	■ MLSA and other relevant government agencies (i.e., those responsible for tourism) ■ Relevant stakeholder groups (e.g., travel agents, outfitters, hotels etc..)	■ Hudson Resource Stakeholder Relations Manager
	Evaluation Process and Adaptive Management Strategies				
	■ Hudson Resources will regularly evaluate if it is achieving commitments outlined in the Social Impact Assessment (SIA) and the efficacy of its monitoring programs. In the case that permanent or temporary housing vacancy rates are noticeably reduced as a result of use by Project employees and their families, Hudson Resources will collaborate with relevant government agencies, businesses, communities and stakeholder groups to identify possible solutions that will benefit communities and satisfy Project accommodation requirements.				
Social and Health Effects	■ Minimize effects on population and demographics in Qeqqata Municipality as a result of the Project	■ Monitor annual population and demographic statistics published by Statistics Greenland ■ Work with municipal government to monitor population change in the towns and settlements of Qeqqata Municipality	■ Annual monitoring during the construction and operation phases	■ MLSA and other relevant government agencies	■ Hudson Resources Stakeholder Relations Manager

Table 11: Monitoring and Evaluation Plan

Social Parameter	SIA Commitment	Monitoring Method	Frequency	Reporting and Submission of Monitoring Results:	Responsibility
	■ Minimize negative effects on the health and well-being of employees, their families and communities	■ Monitor employee perceptions of individual and family health and well-being. ■ Work with government and health and social service providers' to monitor local changes to health and well-being.	■ Bi-annual monitoring during construction and the first three years of operations ■ Annual monitoring during the remainder of operations phase.	■ MLSA and other relevant government agencies (i.e., those responsible for health and social services) ■ Relevant stakeholder groups (e.g., employees, health and social service providers, other companies working in the extractive industries)	■ Hudson Resources' Stakeholder Relations Manager
	■ Minimize pressures on public health services	■ Work with healthcare service providers, institutions, and municipal government representatives to monitor changes in the capacity of local health services.	■ Bi-annual monitoring during construction and the first three years of operations ■ Annual monitoring during the remainder of operations.	■ MLSA and other relevant government agencies (i.e., those responsible for health services) ■ Relevant stakeholder groups (e.g., health service providers)	■ Hudson Resources Stakeholder Relations Manager
	Evaluation Process and Adaptive Management Strategies				
	■ Hudson Resources will regularly evaluate if it is effectively mitigating health and well-being effects as outlined in the Social Impact Assessment (SIA), as well as the efficacy of its monitoring programs. In the case that the capacity of local health services or local perceptions of health and well-being are noticeably reduced as a result of the Project, Hudson Resources will collaborate with relevant government agencies, communities and stakeholder groups to identify possible solutions that will benefit communities and satisfy Project health requirements.				

Table 11: Monitoring and Evaluation Plan

Social Parameter	SIA Commitment	Monitoring Method	Frequency	Reporting and Submission of Monitoring Results:	Responsibility
Cultural and Natural Values	■ Develop Chance Finds Procedures	■ Monitor the number of Chance Find incident reports filed ■ Monitor the comprehensiveness of corrective actions taken	■ Annual monitoring throughout construction and operation phases	■ MLSA and other relevant government agencies (i.e., those responsible for cultural heritage) ■ Affected communities and stakeholder groups (i.e. Greenland National Museum and Archives).	■ Hudson Resources Stakeholder Relations Manager
	■ Minimize effects on the issuance of recreational and commercial hunting licences in the LSA (particularly in relation to musk ox licenses).	■ Monitor the number of hunting licences issued by Qeqqata Municipality.	■ Annual monitoring during the construction and operation phases	■ MLSA and other relevant government agencies (i.e., those responsible for issuing residential and commercial hunting licenses); ■ Affected communities and stakeholder groups (i.e., hunters associations)	■ Hudson Resources Stakeholder Relations Manager
	■ Minimize effects on the harvesting of wildlife in the vicinity of the Project.	■ Monitor hunters' perceptions of the effects on dust and noise on the availability of wildlife in the vicinity of the Project.	■ Annual monitoring during the construction, and for the first five years of operations	■ MLSA and other relevant government agencies; ■ Affected communities and stakeholder groups (i.e., hunters associations)	■ Hudson Resources Stakeholder Relations Manager
	■ Minimize effects on the harvesting of local resources (such as berries and plants) in the vicinity of the Project.	■ Monitor resource user's perceptions of the effects of dust on the quality of resources in the vicinity of the Project.	■ Annual monitoring during the construction and operations phases	■ MLSA and other relevant government agencies (i.e., those responsible for environment and natural resources) ■ Affected communities and stakeholder groups (i.e., natural resource harvesters, traditional resource users)	■ Hudson Resources ' Stakeholder Relations Manager

Table 11: Monitoring and Evaluation Plan

Social Parameter	SIA Commitment	Monitoring Method	Frequency	Reporting and Submission of Monitoring Results:	Responsibility
	■ Develop Motorized Vehicle Policy for Project roads	■ Monitor the effectiveness of the Motorized Vehicle Policy (i.e. number of accidents, near misses, and incidents involving wildlife on Project roads)	■ Annual monitoring during the construction and operation phases	■ MLSA and other relevant government agencies (i.e., those responsible for transportation) ■ Affected communities and stakeholder groups	■ Hudson Resources Stakeholder Relations Manager
	■ Develop Unauthorized Rider's Policy	■ Monitor the effectiveness of the Unauthorized Rider's Policy for Project vehicles (i.e., the number of incidents involving unauthorized riders)	■ Annual monitoring during the construction and operation phases	■ MLSA and other relevant government agencies (i.e., those responsible for transportation) ■ Affected communities and stakeholder groups	■ Hudson Resources Stakeholder Relations Manager
	■ Effects of participation in the wage economy on the ability of commercial hunters and fishers to maintain commercial licenses	■ Monitor the number of commercial hunting and fishing licenses issued to Project employees ■ Work with employees to monitor the effects of Project employment on the ability to maintain commercial licenses	■ Annual monitoring during the construction and operation phases	■ MLSA and other relevant government agencies (i.e., those responsible for employment and the issuance of hunting licenses) ■ Affected communities and stakeholder groups (i.e., labour associations, hunters and fishers associations)	■ Hudson Resources Stakeholder Relations Manager
	■ Minimize effects of Project employment on participation on socio-cultural activities, social cohesion and the transfer of traditional knowledge	■ Work with Project employees (of Greenlandic descent) and LSA residents to monitor perceptions of the effects of increased participation in the wage economy on important socio-cultural activities including hunting, fishing handcraft, social cohesion and the transfer of traditional knowledge.	■ Annual monitoring during the construction and operation phases	■ MLSA and other relevant government agencies (i.e., those responsible for social and cultural health and well-being) ■ Affected communities and stakeholder groups	■ Hudson Resources Stakeholder Relations Manager

	Evaluation Process and Adaptive Management Strategies
Cultural and Natural Values (Continued)	■ Hudson Resources will regularly evaluate the effectiveness of its mitigation measures outlined in the Social Impact Assessment (SIA), as well as the efficacy of its monitoring programs. In the case that Chance Finds Procedures, Motorized Vehicle Policy, or Unauthorized Rider's Policy are deemed ineffective, or in the case that participation in hunting and socio-cultural activities is noticeably reduced as a result of Project participation, Hudson Resources will collaborate with relevant government agencies, communities and stakeholder groups to identify possible solutions that will benefit communities while satisfying Project employment requirements. ■ In the case that resource users perceive effects to wildlife as a result of dust and noise on wildlife and/or the quality of other resources, Hudson Resources will undertake further studies on the effects of air quality and noise on wildlife and present results to relevant government agencies and residents of the LSA; and collaborate with affected stakeholders to identify possible solutions that will address community concerns.

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